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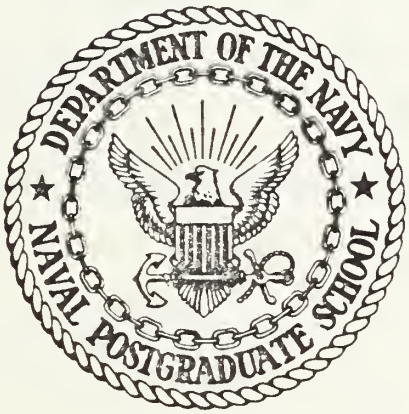

THESIS

AN OVERVIEW OF THE NAVY AUTOMATED TRANSPORTATION DOCUMENTATION SYSTEM (NAVADS)

by

Joseph Ralph Bonomo

March 1985

Thesis Advisor: Dan C. Boger

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This thesis will address some of the basic, current, and historic issues that confront the system and those issues which have

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An Overview of the Navy Automated Transportation Documentation System (NAVADS)

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This thesis will address some of the basic, current, and historic issues that confront the system and those issues which have found solutions within the NAVADS framework. The paper will also provide a rudimentary description of the system operation in terms of the files, programs, and solution methods used by the system to perform its mission. Additionally, the thesis will provide a brief review of a civilian freight operation within the ADP environment. The thesis is designed to work as a primer to provide an orientation in basic NAVADS operations and the problematic and operational environment in which it operates.

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TABLE OF SYMBOLS AND ABBREVIATIONS

ACA	Air Clearance Authority
ADP	Automatic Data Processing
ATCMD	Advanced Transportation Control and Movement Document
AFR	Air Force Regulation
ALCO	Consolidated California Freight
AUTODIN	Automatic Digital Information Network
AVS	Automatic Vehicle Scheduler
BALD	Bay Area Local Delivery
BDP	Basic Data Package
BDPMS	Basic Data Package Maintenance System
CBL	Commercial Bill of Lading
CFR	Carrier Freight Regulations
COBOL	Common Business Oriented Language
CRIF	Cargo Routing Information File
CRT	Cathode Ray Tube
DAASO	Defense Automatic Addressing Systems Office
DBMS	Data Base Management System
DDN	Defense Data Network
DGSC	Defense General Supply Center
DLSC	Defense Logistics Service Center
DLA	Defense Logistics Agency
DLR	Depot Level Repairable
DOD	Department of Defense

DTO	Direct Turn Over
DOCID	Document Identifier
DOT	Department of Transportation
ES	End Strength
EST	Estimated
FAD	Force Activity Designator
FSC/PN	Federal Stock Class/Part Number
FMSO	Fleet Material Support Office
GBL	Government Bill of Lading
ICP	Inventory Control Point
IE	Industrial Engineering
I/O	Input/Output
IMCO	Inter-government Maritime Consultive Organization
IND	Indicator
INS	Interactive Network Software
IPS	Issue Priority Group
LAN	Local Area Network
LBL	Local Bill of Lading
LTL	Less Than Truckload
MAC	Military Airlift Command
MCS	Management Control System
MDL-N	Management Data List-Navy
MH	Manhours
MILSTAMP	Military Standard Transportation and Movement Procedures
MILSTRIP	Military Standard Requisition and Issue Procedures

MSIR	Master Stock Item Record
NAVMTO	Navy Material Transportation Office
NARF	Naval Air Rework Facility
NAVADS	Navy Automated Transportation Documentation System
NAVSUPSYSCOM	Naval Supply Systems Command
NATDS	Navy Automated Transportation Data System
NISTARS	Navy Integrated Storage Tracking and Retrieval System
NSC	Naval Supply Center
NSCO	Naval Supply Center Oakland
NSY	Naval Shipyard
NOA	Notice of Availability
NMFC	National Motor Freight Class
NIIN	National Item Identification Number
NRFI	Not Ready for Issue
NEF	NAVADS Exception File
NFF	NAVADS Freight-Hazardous File
NNF	NAVADS Name-Address File
NIF	NAVADS Issue File
NXF	NAVADS Cross-Reference File
NSF	Navy Stock Fund
OJT	On-the-Job Training
PACOM	Pacific Command
POD	Point of Debarkation
POE	Point of Embarkation
POS	Proof of Shipment

PROJ CODE	Project Code
RASP	Remote Access Survivable Processing
REQ	Requisition
REQ. SCN	Requisition Shipment Control Number
RDD	Required Delivery Date
RFI	Ready for Issue
SCDH	System Communications Data Handler
SU	Shipment Unit
SCN	Shipment Control Number
SU. SCN	Shipment Unit Shipment Control Number
SLC	Shipment Life Cycle
SDC	Service Designator Code
SWT	Service Wide Transporation Funds
SPLICE	Stock Point Logistics Integrated Communications Environment
TAPS	Terminal Application Processing System
TANDEM	TANDEM Computer Corporation
UMMIPS	Uniform Material Movement and Issue Priority System
UADPS-SP	Uniform Automated Data Processing System - Stock Point
USM	Usual Surface Mode
UIC	Unit Identification Code
UPS	United Parcel Service
UN	United Nations
WTCA	Water Terminal Clearance Authority

I. INTRODUCTION

The Navy Automated Transportation Documentation System (NAVADS) is a Naval Supply Systems Command (NAVSUPSYSCOM) sponsored automated data processing (ADP) system project designed to coordinate the management, planning, and control of material movement at naval stock points.

NAVADS represents an important benchmark in the standardization of Navy stock point operations. It provides stock point managers with the capability to automate material transportation consolidation and documentation processes. Additionally, NAVADS can maintain and provide material location data for shipments passing through or originating at a stock point. NAVADS will allow Navy stock points of the future to participate in Defense Department-Wide physical distribution service networks through its Defense Data Network (DDN) interface capabilities and conformance in handling standardized defense logistics data structures.

NAVADS consists of three major subsystems. Within these three subsystems there resides five operating modules: The Basic Data Package (BDP) (Subsystem I, Module I), The Management Control System (MCS) (Subsystem II, Module II), and the Automated Documentation System (Subsystem II, Modules III, IV and V). NAVADS operates as part of an integrated triad consisting of the Uniform Automated Data Processing System-

Stock Point (UADPS-SP) and the Navy Integrated Storage Tracking and Retrieval System (NISTARS).

This thesis provides a general introduction to NAVADS and identifies some key historical and current issues. There are many issues facing the project managers of NAVADS. These issues range from project accountability to issues dealing with maintaining NAVADS as a viable and adaptive system as data processing and logistics technology, methods, and procedures change. Additionally, managers must concern themselves with issues that may change the functional environment within which the system operates. These issues may mandate a greater ability to anticipate future requirements in maintenance and life cycle management of NAVADS hardware and software facilities. Some of these current issues include:

1. Economic analysis efforts to measure the effect of NAVADS on operating efficiency.
2. Implications of the ADA programming language for NAVADS.
3. Increased retrograde accountability for aviation repairables to be held within the Navy Stock Fund (NSF).
4. Aspects for security and/or processing continuity for NAVADS.
5. How the NAVADS local delivery system can better serve local delivery documentation.
6. Problems faced by the communications and area network software systems within the NAVADS operating environment.

Additionally, this thesis will view NAVADS' capabilities to handle some historic issues in Navy physical distribution such as:

1. Material consolidation and transportation selection;
2. Shipping Document preparation;
3. Material Transshipment;
4. Stock Point Material Tracking.

The research for this thesis was conducted over a five month period. The major portion of this time was spent collecting and reviewing current literature and service manuals for the NAVADS system. Field trips were conducted to NSC Oakland, CA, Naval Supply Systems Command (0611), Washington, DC, and Fleet Material Support Office (FMSO) Codes (92) and (93), Mechanicsburg, PA.

The following chapter will provide an historical perspective of the changes in logistics procedures and methods within the defense community. This will help in understanding the development and need for NAVADS within the broad context of the overall evolution of military and naval logistics. Chapters 3 and 4 will discuss the system's basic operation and technical methods to handle some of the historic issues that have confronted stock points over the years. Chapter 5 will provide a brief survey of some of the current issues involved with NAVADS. Chapter 6 will have a brief overview on ADP methods used by a civilian express freight firm to operate their transportation operations. Chapter 7 will provide a summation and recommendations toward possible solutions to some of the current issues.

II. HISTORICAL PERSPECTIVE

NAVADS' development must be taken in the context of the historically progressive requirements placed upon the military logistics establishment. In 1962 the Military Standard Transportation and Movement Procedures (MILSTAMP) program was established as a Department of Defense (DOD) standard requiring fundamental changes in transportation practices. These changes were needed in the face of growing demands for an ever widening variety and quantity of material commensurate with increases in timeliness and accuracy of its delivery. These requirements were necessitated by the changing criticality and fluidity of the strategic and tactical environment as well as dilation of Navy responsibilities worldwide. The primary mission of quick and accurate delivery while dealing with the problem of the distribution of limited resources within DOD required the development of projects that would minimize human error wherever possible, consolidate resources, and provide for efficient and effective use of stock and transportation assets. To accomplish these aims the implementation of MILSTAMP required:

1. Advanced Shipment Planning
2. Automatic Preplanning of Shipment Units
3. Mechanized Preparation of Shipping Documents

In 1962, when ADP systems were still in their infancy, hardware consisted of batch operating systems of undiversified capability limited to sorting, comparisons, and some mathematical and scientific applications. Software was just coming into the COBOL developmental stage and real time applications were non-existent. Document preparation and consolidation was done via eighty card column parameter cards prepared by clerks with keypunch machines and/or paper tape which were read onto magnetic tape and queued into a particular system for sequential processing. While some labor and logic intensive clerical activities were relieved by the sort and compare abilities that computers offered, the operating environment, within which these facilities were in use, demanded more as the responsibilities for the operating forces of the DOD were increased. These increases required more resources at a faster rate which progressively outpaced the capabilities of the older analog-batch systems. Time was now considered a new limited resource. Ordering, preparing, packing, and shipment of material goods now not only needed quantity and quality but speed and an audit trail to maintain accountability concordant with the increase in material transactions.

In 1977 DOD and the individual armed services logistics organizations began to develop their own consolidation and documentation systems, such as, Army SPEEDEX, the Air Force Shipment Documentation Control System and the Defense Logistics Agency's MOWASP and MOFAST systems. All of these systems

were developed for a twofold reason. The first was to take advantage of the advances in ADP technology now capable of virtual and user transparent operations in a real-time, on-line environemtn operated by personnel who are not required to be computer specialists or experts. The second reason was to move toward consolidation and standardization of transportation and logistics operations within the DOD logistics organization and, of course, the armed services themselves.

This evolution was started by the introduction of MILSTAMP and its related program for the standardization and distribution of automated logistics document standards, Military Standard Requisition and Issue Procedures (MILSTRIP). Following on its heels were the benchmarking and establishment of Issue Priority Groups (IPS) and a standardized processing and delivery priority system called the Uniform Material Movement and Issue Priority System (UMMIPS).

Several years later the groundwork for the development of the Navy's own transportation consolidation and documentation system was begun with the publication of the Fleet Material Support Office (FMSO) NAVADS Requirements Statement in February 1978. This FMSO Requirements Statement cited the problem facing Navy stock points at this juncture [Ref. 1: p. 3]:

> "Presently the Navy transportation system reacts to the supply issue action described in MILSTRIP by manual preparation, processing, and control of transportation documents in unwieldy, slow and inefficient methods. Some Navy shipping activities are performing these

functions on a limited basis by combining a manual and mechanized augmentation system to fit their local operation."

Briefly, each Navy shipping activity was operating in an "ad hoc" environment, combining manual and clerical intensive ancillary activities with limited ADP resources resulting in a vast and individually unique collection of incompatible systems. Each system had its own set of data elements, protocols, and output products which had evolved to conform to local requirements. This lack of standardization led to an inability to properly develop transportation management goals, such as preplanning, consolidation of shipping units, and reduction in expenditures of Service-Wide Transportation funds (SWT). The basic goal of NAVADS, as with any other system introduced in a military or civilian working environment, is to free personnel from detailed logic and labor intensive work. This allows the retargeting of human resources to higher considerations, such as strategic planning within one's own organization in the areas of preplanning, control, and management of the logistics transportation environment.

The goals of NAVADS are as stated in the NAVADS Functional Description [Ref. 2:p. 5]:

1. Automate Shipment Planning
2. Mechanize Shipment Documentation Preparation
3. Track Material Movements at Supply Centers
4. Conserve Operational and SWT Funds

5. Meet UMMIPS Time Frames

6. Measure Supply Center's Complete Performance

NAVADS must be logically viewed and understood as being an integral part of a greater stock point automated network consisting of the Burrough's Medium System, the NISTARS-TANDEM system and the TANDEM-SPLICE system, as it will exist in its final configuration. Presently NAVADS is operating within a network consisting of a Perkin-Elmer minicomputer system utilizing TAPS I as an interim measure until the installation of the TANDEM-SPLICE hardware and implementation of the TAPS II system.

The description of the three NAVADS subsystems and modules will be discussed in the following two chapters. It is important to recognize that NAVADS is an interfaced system, within a larger system, existing to provide the specific function of furnishing logical collation of basic data package elements and entities to output reports, issue material orders, automate documentation, and perform shipment consolidation.

Recognizing the diversity of Navy stock points, NAVADS is structured to satisfy these varietal mixes of area responsibilities, constraints and perogatives. The FMSO Functional Description [Ref. 2:p. 3] states:

> "Sufficient options will be provided in the modules to accomodate individual stock point preferences. In addition to the tailored application programs that will be developed for the various functional areas of NAVADS, a report generator capability will also be available to

facilitate extraction of information from NAVADS files as required."

III. BASIC NAVADS STRUCTURE FOR SUBSYSTEMS I AND II

NAVADS consists of three major subsystems containing five operational modules generating the required reports, documents, and updates needed to meet modern Navy Stock Point material operations. These Subsystems are: Subsystem I, The Basic Data Package (BDP); Subsystem II, The Management Control System (MCS): Subsystem III, The Automated Documentation System. Subsystem III, the heart of the NAVADS Automated Documentation system on the minicomputer, will be discussed in the following chapter.

This chapter will give a brief overview of the first two subsystems, their related modules and the basic files and programs which link them together and provide update and data communications capability with the NAVADS system internally and with the outside environment.

A. SUBSYSTEM I

Subsystem I, The Basic Data Package (BDP), is composed of Module I, it is resident within the Burroughs Medium System hardware. The data required to support mechanized physical distribution and documentation efforts are great in magnitude. Within the environment of the BDP are the sum total characteristics of the two basic data entities used in NAVADS, the National Item Identification Number (NIIN) and the Unit

Identification Code (UIC). The BDP consists of those data elements which describe the peculiarities of both the requisitioned material and the ultimate destination of the material and other factors which affect shipping processes in terms of time, documentation, shipping method, and consolidation.

The data elements of these entities are updated by a number of external activities such as the Defense Logistics Service Center (DLSC), the Defense Automatic Addressing Systems Office (DAASO), and Navy Inventory Control Points (ICP). Updates, reformats, and new entries are handled by the Basic Data Package Maintenance System (BDPMS). This system accepts information from a variety of input sources, such as CRT data entries, parametric card images (by either CRT screen images or actual 80 column cards) and by AUTODIN (tape or card). Data maintenance is performed on four basic files which make up the BDP:

1. NFF - NAVADS Freight-Hazardous Data File
2. NNF - NAVADS Name and Address File
3. CRIF - NAVADS Cargo Routing Information File
4. NEF - NAVADS Exception File

The NFF contains characteristics on each item in stock at a NAVADS site, keyed on the NIIN data entity. The file maintains information on those data elements which will affect the issuance, handling, packing requirements, and documentation of the item in order to effect successful shipment, by whatever means appropriate, to keep within UMMIPS time frames

and cargo handling regulations. The data format of the NFF is shown in Table 1 as extracted from the NAVADS Data Specifications [Ref. 3:pp. 3-65-3-66] and the NAVADS Subsystem User's Manual [Ref. 4:pp. 2-3-2-5]. The file is maintained on a disc pack and has a 576 byte maximum record size for each NIIN carried by the stock point. the NFF conforms to the Navy Blocked Random file format as do all the files in Subsystem I, in order to accomodate specifications calling for both random and sequential accessing capabilities.

The NNF contains the address data for customer activities receiving material from a NAVADS stock point. Information obtained here is keyed on Unit Identification Codes (UIC) (including the Service Designator Code (SDC)). The NNF is used to store plain language parcel post and freight addresses as well as aerial and water port points of embarkation (POE) and debarkation (POD). The data format for the NNF are shown in Table 2 as extracted from the NAVADS Data Base Specifications [Ref. 3:pp. 3-74-3-75] and the NAVADS Users Manual [Ref. 4:pp. 2-5-2-6]. The file is maintained on a disc pack and has a 1200 byte maximum record file size for each UIC. It conforms to the Navy Blocked Random file format to accomodate random or sequential access.

The NNF receives inputs and returns outputs using some of the same programs as the NFF, specifically, J-XJ1B and J-XJ1D. The NNF also provides information for output for programs J-XJ2B and J-XJ2C to provide shipping data for the real time

and batch issuing systems. A summary of specific Subsystem I and II programs are in Appendix A.

The CRIF is a file entity established by each NAVADS site to provide routing instructions for logical and efficient shipment of material to various customer locations or activities. The file maintains four air and four surface routing channels for each UIC. "Outchop" cutoff dates are kept for each mobile UIC and routing channel. The CRIF shipping data file is a revolutionary concept in transportation efficiency. It ensures the material shipping method, routes and channels are temporally compatible with vessel movements or afloat staff location changes in geographic or organizational responsible areas worldwide. Until NAVADS, this process had been done on a manual basis depending solely on human initiative and logic skills. The data format for the CRIF is shown in Table 3 as extracted from the NAVADS Data Base Specifications [Ref. 3:pp. 3-57-3-58] and the NAVADS Users Manual [Ref. 4: pp. 2-6-2-8]. As can be seen from the table, the air and surface shipping channel information sections contain specialized data commensurate with appropriate modes of shipment either air or surface. The CRIF is maintained on a disc pack and has an 800 byte maximum record size for each UIC so chosen to be data-stored by a particular NAVADS site. The file conforms to the Navy Blocked Random file format providing for random or sequential access.

The last file making up the BDP is the NEF which is used for storing report information on exception aspects of the BDP for later use in formulating different reports. The NEF is essentially a holding or a scratch file for use in the update interface for various sub-files at the local NAVADS sites and the master file maintenance site at Norfolk. The file is held on a disc pack and each sub-file is 800 bytes long. The NEF file and its sub-files are listed in Table 4. The file and its sub-files conform to the Navy Blocked Random file format. The NEF interacts with the NFF, the NNF, and NAVMTO via the programs listed in Appendix A.

For purposes of working with the BDP, the NEF interacts mainly with the J-XJ1B, J-XJ1C, and J-XJ1G programs. The Real Time NFF/NNF Update Program writes NFF update data exceptions to the NEF. Later this information is punched on AUTODIN card and sent to NSC Norfolk for inclusion into the Master NFF update. The NNF Update Program allows only the file maintenance site to write updates to the NEF. These are later blended into the individual NAVADS sites' NNF's. This enhances the concept of viewing the NEF only as a scratch or holding file for temporary use in the updating process. The NEF is most actively used in the operation of Subsystem II which is a multi-functional module.

B. SUBSYSTEM II

Subsystem II is the NAVADS Management Control Subsystem which is comprised of Module II. The Management Control Subsystem (MCS) is the central operating module of NAVADS. The MCS has a multitude of operational responsibilities in terms of collating, filing, and queuing a multiplicity of inputs into a wide variety of outputs. These outputs consist of several types. Some are simple internal file queues, printed listings and reports and others are formatted documents, as in reference to the DD 1348-1 issue documents utilized for material distribution purposes. Additionally, the MCS had adjunct responsibilities in maintaining the BDP.

This section on the MCS will identify and briefly discuss major Subsystem II, Module II program interactions, which produce the various listings and modal selections related to the shipping process. The MCS is the source of many decisions based on relating the NIIN data entity to attributes of the destination UIC data entity. The MCS, in basic terms, uses the character data elements related to aspects of a certain piece of material and makes logical decisions. These decisions are based on restrictions, regulations, and requirements attached to a particular shipment or Shipment Unit (SU) as they pertain to the material's destination as represented by the customer's UIC. Additionally, the MCS utilizes user input issue requisition and environmental attributes such as IPG and issue backlog to determine workload priority, issue and

packing priority, shipment consolidation, and certain modal selections.

The following is a partial list of major functions, logical responsibilities, and decisions that NAVADS Subsystem II is designed to perform:

1. Assign Shipment Control Numbers (SCN)
2. Generate Workload Reports to NISTARS
3. Provide Documentation Files to Subsystem III
4. Selects Shipping Modes
5. Shipment Consolidation
6. DD 1348-1 Issue Document Production
7. NAVADS Exception Listing
8. Planning and Warehouse Area Statistic Reports
9. Air Challenge Listing
10. AUTODIN ATCMD Data Change Operations

A management feature available to the NAVADS user, through the MCS, is the capability to suppress the release of IPG II and III requisitions from the NAVADS Issue File (NIF). The NIF is a holding file where IPG II and III requisitions are held for later issue release for workload or shipment planning reasons. The NIF uses the following attributes as release controls; "MARK FOR" UIC, Warehouse Area Code, Country Code, and CONUS Geographic Area.

Selection for release of IPG II and III requisitions from the NIF can be done using the following record attributes; "MARK FOR" UIC, CONUS Geographic Sub-Area, Issue Priority

Group, Project Code, Warehouse Area, Country Code, CONUS Geographic Area, Water Port of Embarkation and Water Port of Debarkation. The user can also specify which UIC's are not eligible for consolidation.

Once selections for the NIF release parameters have been made and UIC consolidation eligibility has been determined this program will then consolidate requisitions into shipment units. The program first makes a consolidation eligibility appraisal of candidate requisitions for a particular shipment unit. When the appraisal of candidate documents is favorable to shipment unit formation, a Shipment Unit Shipment Control Number (SU, SCN) is assigned to each shipment unit. The eligibility attributes for shipment consolidation are:

1. UIC is eligible or is designated eligible for consolidation
2. UIC NFF record does not indicate Local Delivery
3. Document number is not a bearer walk-through
4. The "MARK FOR" UIC's are the same
5. Warehouse Area Codes are the same
6. Item is not sensitive, hazardous or oversize
7. Weight/Cube data is present in the requisition record
8. Weight/Cube of Shipment Unit exceeds Parcel Post requirements.

When the Shipment Unit is formed, mode selection takes place for appropriate surface transportation which would be either "5" (UPS), "G" (Surface Parcel Post), "V" (SEAVAN) or

"B" (Less Than Truckload (LTL). Bearer Walk-Throughs are "X", Local Delivery UIC's are mode "9" selected and units that contain sensitive, hazardous, oversize, or dangerous material are coded "Z" or break bulk select in accordance with mode selection parameters in Table 5. Consolidated freight is assigned the mode indicated in the Usual Surface Mode (USM) for that Shipment Unit (SU) UIC as it appears in the NNF.

When this has been completed, the requisitions are released from the NIF, the corresponding NXF entries are also deleted and a DOCID "ZAU" is written to the Physical Inventory Queue so that UADPS-SP Physical Inventory updates can be done.

Subsystem II also generates a series of seven management reports, designed to keep physical distribution and data processing managers appraised of the MCS's activities. These reports are listed in Table 6. MCS programs utilized for subsystem operations are in Appendix A.

IV. SUBSYSTEM III

A. OVERVIEW

This chapter will concentrate on the production of the six basic documents produced by NAVADS; DD 1387 Military Shipping Labels, Government Bill of Lading (GBL), Commercial Bill of Lading (CBL), GBL/CBL Continuation Sheets, Notice of Availability (NOA) DD 1348-5 and TCMD/ATCMD, in both the hard copy and AUTODIN options. This chapter will also discuss Subsystem III's ability to solve the problems involved in tracking requisitioned material through the stock point. Also, briefly discussed, will be the files, programs and reports utilized for Module IV, Transshipment Control. A summary description of the Subsystem III programs used for automated document production are in Appendix B.

NAVADS Subsystem III is the real time, minicomputer operated automated documentation system composed of three logical modules, Modules III, IV and V. Module III is the Automated Documentation module itself, designed to alleviate the burdensome task of physical transportation documentation preparation. Module IV is the Transshipment Module responsible for receiving, classifying, documenting, and tracking material that is passing through a stock point from an outside activity to another destination. Module V is the Local Delivery module, originally conceived to be a macro-automatic vehicle scheduler

and local load planner for stock point deliveries within a designated area classified as local for a particular stock point.

Subsystem III resides on Perkin-Elmer series 32 minicomputers at the various NAVADS sites. In the Spring of 1985, NSC Jacksonville, Florida will place its TANDEM-SPLICE system into operation, replacing the Perkin-Elmer minicomputer. The TANDEM-SPLICE system will eventually be installed at all naval stock points equipped with NAVADS.

Presently the Perkin-Elmer system uses two interface communication subroutines, the System Communications Data Handler (SCDH) to receive record data for Subsystem III files from the Subsystem II files and the INS software system to communicate with its CRT's for document processing. TANDEM-SPLICE hardware will take over many of these protocols for communications through integrated front-end and back-end communications processing with the different Subsystems and their hardware within the Local Area Network (LAN).

Subsystem III performs its documentation and tracking duties by utilizing a series of nineteen interactive files which draw information from the interactive and batch files in the first two subsystems. The record data required to maintain these files are provided by magnetic tapes or hardware/program queues by the Management Control Subsystem. These nineteen interactive files provide the record data for twenty-six printed listings, reports and documents plus a wide

variety of CRT screen image formats used for inquiry, display, changes, additions, and deletions of record data regarding individual shipping unit status, location, documentation, requisitions, and shipping control unit formations. A listing of the TAPS/DM interactive files are displayed in Table 7. The Subsystem III reports and documentation are listed in Table 8.

B. BASIC SHIPPING DOCUMENTS

The DD 1387 Military Shipping Label is the most basic document produced by Subsystem III, but the most crucial since it provides the primary routing reference for transportation personnel during the physical handling of the shipping unit itself. The information required for the composition of the labels are contained within the Shipment Unit Data File (TAPS/DM (002)). There are two different sets of interactive programs in use for the production of the shipping labels, the NON-AIR and AIR versions, depending on the shipment mode assigned to a particular shipment control number. An example of a DD 1387 is in Table 9.

The Notice of Availability (NOA) DD 1348-5 is an automatically produced document used by stock points to notify foreign country representatives and applicable freight forwarders that material for a particular country is available for shipment. This NOA is provided for material from either the Security Assistance Program or the Foreign Military Sales Program. The NOA documentation function operates through the

Shipment Unit Data File (TAPS/DM(002)) and the Requisition Data File (TAPS/DM(001)) for record information and processes it through three Subsystem III programs; VØ123Ø, VØ124Ø and VØ125Ø. An example of a NOA is in Table 10.

Government Bills of Lading (GBL) are produced by Subsystem III to document and provide clearance for the transportation of material by land or sea routes via commercial carrier in a limited liability environment an example of a GBL is in Table 11. It is a primary document for surface shipment conforming to procedures as specified in NAVSUPINST 4600.70 (series). GBL Front Sheets are produced through system access to the Transportation Unit Data File (TAPS/DM (003)) and the manipulation of data in this file by programs, VØ317Ø, VØ324Ø, VØ325Ø and VØ335Ø.

Commercial Bills of Lading (CBL) are contracts between a shipper and a commercial transporter to furnish material movement services in accordance with specific commercial liability limits as specified by the standard printed clauses on the CBL document itself. An example of a CBL is in Table 12. The CBL's are printed using data within the (TAPS/DM(003)) file utilizing Subsystem III programs VØ322Ø, VØ33ØØ and VØ331Ø.

GBL/CBL Continuation Sheets hold overflow information that cannot be held on the front sheet of a Bill of Lading alone. NAVADS utilizes a single common program to handle the production of standard Continuation Sheets for both normal GBL's and CBL's. This common program is (VØ315Ø).

The last of the six basic transportation documents produced by Subsystem III is the DD-1384 Transportation Control and Movement Document (TCMD) as shown in Table 14 and Advanced Transportation Control and Movement Document (ATCMD) as in Table 15. These documents are used to give routine or advanced notification of a shipment to an Air Clearance Authority (ACA) or a Water Terminal Clearance Authority (WTCA) for shipments going to an air or water Port of Embarkation. The TCMD can also be used as a manifest for actual movement or shipment of material. The subsystem also has the capability of producing and transmitting ATCMD's card images via AUTODIN to the NAVMTO NATDS system for Navy and Coast Guard shipments and to other ACA's and WTCA's for other-service ATCMD's related requirements.

TCMD production utilizes the TCMD Image Work File (TAPS/DM(026)) to produce the required hard copy and AUTODIN card images. For this purpose (TAPS/DM(026)) uses five Subsystem III programs V26Ø1Ø, V26Ø2Ø, V26Ø4Ø, V26Ø6Ø and V26Ø8Ø. There are six types of TCMD headers for six types of CRT formatted workscreen images. The type of TCMD DOCID header is dependent on the method of shipment being used in conjunction with the type of material being shipped. Appropriate TCMD DOCID headers are cued by the user choice of an interactive function as listed here:

1. SUPODM - Prime Shipment Unit
2. SAEODA - Shipments of hazardous material

3. SUGVWI - Shipments of government vehicles, wheeled trucks, guns and aircraft

4. VENDSH - Vendor shipments

5. LSULSM - Loose shipment units in SEAVANS or MILVANS

6. SUICSM - Shipment Units in Consolidated Containers loaded in SEAVANS or MILVANS.

TCMS's are used for air and water shipments, ATCMD's are used for air shipments going to Navy and Coast Guard units that require advance notice to NAVMTO, as in the case of Military Airlift Command (MAC) mode F shipments. Navy and Coast Guard ATCMD's use the Shipment Unit Data File (TAPS/DM(ØØ2)) AIRINQ function for this purpose. ATCMD's for other services are processed through (TAPS/DM(Ø26)) with the other air and surface TCMS's.

The automated composition and printing of the six basic documents produced by the NAVADS system lends greater accuracy to document production. The complex and detailed composition of the documents are broken down to simple line or prompt entries on a CRT terminal image or mask. Routings, endorsements, and printed advisories, required by regulation, are automatically applied to the documents, preventing human error or mistaken exclusion of a requirement. Shipment Control Numbers, GBL Numbers and CBL Numbers are all assigned automatically from an internal queue of numbers and accounted for by the system. The source documentation needed to make up the shipment documents are available from the automated files

within Subsystem III as consolidated and delivered by the Subsystem II Management Control Subsystem.

C. STOCK POINT MATERIAL TRACKING

An additional NAVADS' capability is its ability to keep track of requisitioned material as it passes through the stock point from point of issue to point of shipment.

Formerly, stock points would manually issue, pack, move, and ship material, using locally evolved methods, usually centering around the collection and accumulation of DD-1348-1 issue document controlled materials into pallet or tri-wall units for shipment. If for any reason a particular requisition, piece of material, whole pallet, or tri-wall unit had to be located, stopped or retrieved prior to shipment, an extremely labor intensive process had to be performed first. This involved manually accessing the issue records, the records of the packing area (by looking through tremendous piles of individual DD-1348-1's) and physically tracing the material to the shipping or holding warehouse. An experienced person, with good luck combined with practical skill, may take a whole working day doing this kind of investigating and retrieving.

There are many reasons why a stock point may want to track material through the issue process, an example may be to retrieve or stop a piece of material from being shipped.

A customer may have ordered a part or material on an IPG II or III requisition (medium or low priority) and then upgraded the requisition priority with a modifier (AM1) or message. The stock point may find that surface shipment may not conform to UMMIPS time frames now required by the new priority. Under the old system, the part may have just been allowed to go by the old IPG II or III mode of shipment, since tracing the material down may have taken so long that the effort versus potential time saved may not have been worth it. The usual answer was to have the customer initiate a whole new requisition, with the desired higher priority resulting in an uneconomical double issue.

With NAVADS a requisition, regardless of its IPG, is tracked via its Requisition Number Shipment Control Number (REQ.SCN) and/or its Shipment Unit, Shipment Control Number (SU.SCN) from point of issue and packing to its staging at the shipment bay.

Subsystem III uses its Requisition Shipment Data File (TAPS/DM(ØØ1)) and Shipment Unit Data Files (TAPS/DM(ØØ2)) for this purpose.

When material is issued either from bin, NISTARS, or bulk, CRT terminals located in the packing areas have use of an interactive function called PCKUPD. When material reaches the packing area, a clerk or CRT operator enters the REQ.SCN and transmits. When this occurs the file (TAPS/DM(ØØ1)) is updated for that REQ.SCN showing the new packing area location

entry of that material along with the date. When the material is packed it is forwarded to the shipping warehouse for staging and pending shipment. When the material arrives at the warehouse another CRT location update is made. By this time REQ.SCN's that have been mode selected for freight have been consolidated into SU.SCN record groupings, or the REQ.SCN and the SU.SCN can be kept one in the same for material selected for Parcel Post, Mail or UPS on an individual basis. This choice of transportation mode is made according to destination, priority, size and characteristics of the material being shipped (i.e., hazardous or sensitive). The warehouse clerk, using the SU.SCN as a reference number, calls the interactive function FLRLUP from (TAPS/DM(ØØ2)) and enters the SU.SCN and floor location in the shipping area of the material. This does two things. It updates the shipping unit records with the location of the material and flags the (TAPS/DM(ØØ2)) file to allow production of the GBL's and/or the CBL's, since now, the material is ready for shipment in its final profile.

Now, if a customer needs to get to a piece of critical material or the stock point wishes to stop shipment of material, it can inquire the Subsystem III files and not only receive information on where and when it was packed, but also the location of the material in the shipping warehouse and when it got there. The customer services personnel can "put their finger" on the material in minutes rather than hours.

Many of the NAVADS sites have their shipping areas segregated into air, overland surface, and overocean surface subareas to make physical movement and distribution easier. The resulting breakdown to unique shipping areas and dispersal of material into these less dense modules is not a problem for NAVADS to handle and lends itself to faster and easier location of material. The preparation of material and production of the required shipping documents has cut down dramatically on shipment holds in warehouses and has made for easier identification and location of special interest material and shipments.

D. TRANSSHIPMENT CONTROL (MODULE IV)

One of the most difficult problems in the Naval Supply System is tracing or following material going from point of origin to point of destination through a third party. Transshipments were often treated as pariahs within the world of physical distribution. They were entities for which no one had apparent responsibility, and no one wanted to take on as a responsibility. The difficulty centered on priority, documentation, accountability, and time. Priority for a stock point usually lies with the issue and shipment of its own requisitions to its own customers within prescribed time frames. Documentation for items that show up for transshipment can at times be spotty or barely readable. Time to reestablish documentation can be consuming in terms of manpower.

Accountability for transshipment can be almost impossible since audit trails for transshipments often disappear with its priority and documentation. The result of all this is valuable time expended in manually reestablishing priority, creating documentation, and reestablishing the audit trail.

NAVADS assists in these efforts through close definition of transshipments and by creating an electronic, automated pathway allowing the material to pass through a stock point documented for later tracing if required. NSC Oakland (NSCO) handles transshipment in the following manner as extracted from the NAVADS Operator's Handbook [Ref. 5:p. IX-1].

> "For NAVADS purposes, a Transshipment is material NOT resulting from a stock issue AND meeting one or more of the following criteria;
>
> a. Destined for overseas consignee;
>
> b. Eligible for NAVMTO Parcel Post forwarding program to PACOM/CONUS activities;
>
> c. Eligible for delivery via Bay Area Local Delivery (BALD), to consignee;
>
> d. Reparable item coming from Bldg 543 for packing and/or shipping to consignee (a designated overhaul point).
>
> Direct Turnover (DTO) items received for NSC Oakland itself from another activity is not considered to be a transshipment.
>
> The originator's shipping documents can also take many forms; (Vendors Shipping Orders, DD-1149, DD-250, DD-1348). In order to track material transitting the Center (NSCO), transshipments must be entered into the NAVADS systems at the point of entry to the Center. Once entered, transshipments are processed via NAVADS the same as if issued and shipped by NSC Oakland."

Material entering a particular NAVADS site is intercepted directly in the receiving area. A CRT terminal in the receiving area is used to input information about the shipment from the available accompanying documentation. The operator uses a (TAPS/DM(ØØ1)) file function called TRNSHP and is cued by the CRT to make certain inputs (minimum entry is the TCN) regarding the shipment from the accompanying documents. The user also enters the location of the warehouse area to which the material is being sent for further transfer (Parcel Post, UPS, Surface or Overseas, Air or Local Delivery). In this way the material has been entered into the system, accounted for, given a location, and placed on a queue for shipment.

Screen Ø16 of (TAPS/DM(ØØ1)) gives the user a record summary of the just entered Shipping Unit being transshipped. Records for transshipments are kept for 18Ø days on the Transshipment History File (TAPS/DM(Ø23)). This file allows users to have an audit trail on a real-time, on-line basis. The transshipment database is accessible by several keys:

1. DOC.NR. Document Number
2. TCN Transportation Control Number
3. GBL.CBL.NR Government or Commercial Bill of Lading Number
4. SHIP.TO.UIC Ship to Unit Identification Number

Module IV interacts with Module III and provides the same services for the transshipped material once inside the NAVADS arena as for any other issued material.

Module IV now provides, for the previously missing elements unavailable in the unautomated environment, priority of movement, documentation, accountability, and efficient use of time.

V. CURRENT OPERATIONS AND ISSUES

NAVADS was conceived to lessen the logical and manual intensive labor of Navy Stock Points in order for them to concentrate on overall concepts of physical distribution and material management. The system was to provide a level of standardization but was to allow enough flexibility and data processing environmental control so that individual stock points/Naval Supply Centers could adapt their in-house NAVADS system to conform with local constraints and regulations. NAVADS-standardized attributes in hardware and system programming permits the central file maintenance site at NSC Norfolk and the appropriate DLA agencies to keep all Master Stock Item Records (MSIR), Unit Identification Codes (UIC), mechanized Management Data Lists - Navy (MDL-N), and other related files for National Item Identification Number (NIIN) reference updated at all sites at all times with little or no hardware, software, or database conversion problems. In the past, local procedures or applications of hardware and software facilities adapted over the years, allowed the supply system to evolve into a disparate collection of loosely related interfaced systems rather than as a centrally informed, wholly integrated world wide logistics operating complex.

In 1978 the Fleet Material Support Office (FMSO), published an initial NAVADS Requirements Statement, emphasizing the

basic need and justifications for a minicomputer-operated, real-time/batch system to take over the duties of preparing documentation, tracing transshipments, assisting local delivery operations, and automating the military air freight system entry procedures. A set of basic assumptions were defined in the opening statement of the NAVADS Requirements Statement [Ref. 1:p. 6]:

1. Most modules will operate on a stand alone minicomputer configuration complete with random access storage, CRT source data entry I/O (input/output) devices and other peripheral equipment to read, punch cards and print listings.

2. Application software will be programmable in COBOL.

3. A COBOL compiler will be available upon delivery of hardware.

4. A test bed hardware configuration will be installed at FMSO in time to support application program development.

5. A hardware interface will exist between the NAVADS minicomputer and UADPS-SP.

6. The local delivery scheduling module due to program size and complexity may have to run on the Burroughs Medium System.

Of course many of the early assumptions could not foresee future changes in systems loading, technology, and other innovations. A sample of these issues facing NAVADS follows.

A. ECONOMIC ANALYSIS

The FMSO NAVADS project team is currently preparing to engate in an economic evaluation program to measure the aggregate cost and benefits obtained from the automation of

transportation consolidation, documentation, and tracking. The evaluation will be a global system study involving all three subsystems and five imbedded modules.

Current preliminary plans under consideration acknowledge the need to adapt Industrial Engineering (IE) measurement methods to compare the actual level of documentation effort in a manual system versus the documentation effort within the NAVADS system. This effort would consist of passive observation and measurement of human logic and labor effort (in manhours per shipping unit document) in the preparation of the six basic transportation documents;

1. DD 1387 Shipment Labels
2. U.S. Government Bill of Lading (GBL) (SF 1103)
3. Commercial Bill of Lading (Local Forms)
4. GBL/CBL Common Continuation Sheet (SF 1109)
5. Notice of Availability (NOA) (DD 1348-5)
6. Transportation Control and Movement Document (TCMD) and Advanced TCMD AUTODIN formats (DD 1384)

As stated previously, the unit of measurement could be a percentage of manhours per document and/or a volume per person per hour rate. This would be used to formualte a non-automated work standard for Naval transportation documentation at a typical non-automated site. Once this has been accomplished measurement can then be taken at NAVADS automated sites for cost-benefit analysis on net volume of documentation produced (that is, gross volume minus documents returned due to errors).

The dollar cost per manhour (MH) saved with comparative studies of traffic and throughput volume of the system paried against cost of the program over its life cycle can then be presented.

NAVSUP policy, in conjunction with other federal audit services, requires this kind of detailed cost-benefit analysis in order to measure the growing trend in automation costs both of hardware and software as compared to savings obtained in:

1. Operational efficiency
2. Reduction in inventory costs
3. Reduction in occurences of degraded inventory levels
4. Economic goal achievement in meeting UMMIPS standards
5. Revision of End-Strength (ES) goals in savings, both hard and potential.

These categories of savings would be quantified via measurement in the following categories:

1. Material Consolidation Efforts
   a) Pick and pack process
   b) Shipment Unit (SU) formulation.
2. Personnel Effort:
   a) MH spent on manual techpub look ups
   b) MH spent on manual material searches
   c) Savings on labor intensive functions (clerical and mechanical).
3. Realignment and work rule savings based on changes that will occur in productivity due to automated work environment changes caused by NAVADS as duties evolve away from the manual environment and toward the automated environment.

Other physical distribution measurement factors that must be considered as candidates for economic quantification variables at NAVADS sites are:

1. Geographic restrictions on traffic operations
2. Receipt and issue queuing rates
3. Daily processing and backlog rates for IPG I, II, and III issues
4. Operational and tactical situational changes (FAD changes, fleet movement, war damage, etc.)
5. Facilities type and size restrictions
6. Communications environment in which the LAN will be operating.

Further economic analysis variables can be drawn from the analysis of the causalities of economies and diseconomies of scale that result from the actual installation and initial start up of the NAVADS system, such as:

1. Training curve (including OJT time)
2. Learning curve (including error rates)
3. Usurption of routine
4. Physical installation (tear down and build up)
5. Cost of phase-in operations.

Presently NAVSUP and FMSO are using baseline data analysis techniques developed by the Navy and DOD. Two of these analysis models are DIVS (Defense In-transit Item Visibility), for the measurement of dollar savings obtained from the efficient cancellation of material requests before funds are expended on unnecessary shipment, and VOSL (Variable Operating and Safety Level), the part of the UADPS-SP Retail Inventory Module which

measures the cost and dollar savings which are effected by efficient and standardized methods of avoiding requisition processing delays. These models provide basic data in terms of volume and dollar unit savings involved in shipping consolidations, inventory operations, and other phases of the actual physical distribution process.

B. ADA IMPLICATIONS FOR NAVADS

DOD DIRECTIVE 5000.31 states: "Effective 1 January 1984 for programs entering Advanced Development and 1 July 1984 for programs entering Full Development, ADA shall be the programming language."

With the proliferation of so many different computer systems throughout the DOD establishment, it was inevitable that a commensurate, prolific growth in programming languages would occur. It was not unexpected that DOD would eventually end this electronic "Tower of Babel" by exacting efforts toward standardization of coding languages. In terms of strategic thinking, what are the implications for NAVADS? Will NAVADS find itself a victim of the DOD evolutionary process towards language standardization, resulting in a complete re-coding from the present languages to ADA? Will UADPS-SP and NISTARS also be forced to eventually conform as more and more of the services and DOD standardize? It may not be enough to just merely formulate language conversion protocols in order to be able to interface with the rest of the DOD establishment. This is an eventuality that must be considered now and

subjected to detailed study for determining the long range implications not only for NAVADS, but for UADPS-SP, NISTARS and other SPLICE programs.

C. DEPOT LEVEL REPAIRABLES (DLR) ISSUES

DLR's are high cost repairable spare parts serviced at various Naval repair facilities for re-use. As a part of a test started in April, 1981, non-aviation DLR's were reclassified and financed as Navy Stock Fund (NSF) items. Customers are presently charged a "net price" for the items to cover the cost of transportation, rework and item attrition. A "full price" is charged for the item if no turn-in of retrograde is made. The DLR program is expected to be extended to aviation reparables in April, 1985. What implications does this hold for NAVADS? Will the stock points be tasked for transshipment status of NRFI material through a particular NAVADS site? Now that the non-receipt of NRFI material at a depot level activity will hold serious financial implications for a field level activity, do NAVADS sites inherit the task of being a universal reference point or clearing house for missing retrograde? When aviation repairables go into stock fund status, the volume of interest in tracking retrograde through the system will increase dramatically, especially for stock points located in the vicinity of Naval Air Rework Facilities (NARF).

It may be necessary to treat NRFI items in the transshipment module (Module IV) as special case items requiring their

own TAPS(DM) interactive file. This would keep them as a special class of transshipments. This segregation would make file access easier for retrograde transshipment inquiries since sorting through transshipments unrelated to retrograde movement would be avoided.

D. SECURITY AND ADP CONTINUITY

In view of contemporary events, concerning acts of terrorism against military installations at home and abroad, security of data processing equipment and records is increasingly becoming of great concern. The Navy Supply System has become extremely dependent on data systems as can be seen by the extensive data file and operating record structures of NAVADS.

OPNAVINST 5239.1 (series) directs Navy efforts for ADP security and establishes guidelines in providing a security framework for both hardware and record facilities.

Towards this end, the security of NAVADS must be looked at in two ways: the first is the security needed to prevent unauthorized scrutiny and manipulation of working and historical files within the three NAVADS subsystems. The second is to guarantee secure, alternate facilities for NAVADS processing in case of actual hardware damage or destruction due to acts of terrorism, war, or natural disaster.

Unauthorized scrutiny or manipulation of files from a local terminal or (after initiation of SPLICE-DDN operations) from wide area network terminal penetration is a real and

potentially dangerous problem facing Navy Stock Points. In NAVADS several files contain potentially damaging information that could possibly be used to track general locations of ships, aviation squadrons, afloat staffs and other mobile combat units. Especially vunerable are such files as the CRIF, NNF and related air and water transportation clearance and challenge files which list routing codes and plain language routing addresses for various customer UIC's.

The second area of security concerns the advent of damage or destruction of hardware or peripheral devices due to an act of terrorism, war, or as is much more likely, by a natural disaster. NAVADS sites are integral parts of larger Navy complexes, such as operating bases, air stations, rework facilities or shipyards. Their natural proximity to their largest customers, by definition, place them in potential harm's way. As NAVADS develops and becomes increasingly imbedded within naval operations, the consequences of physical damage increases. Whether this damage is caused by climatic, geological or politically motivated acts is irrelevant, the end results are still the same; downtime, lost data, lost records and in increasing probability that total recoverability will not be achieved over time.

E. LOCAL DELIVERY ISSUES

Much of the effort, since the inception of NAVADS, has been to utilize the Subsystem III, Module V portion of the

system as an Automatic Vehicle Scheduler (AVS) for use in planning local delivery routes and scheduling. The AVS concept is presently under research at the David Taylor Naval Ship Research and Development Center in cooperation with tests being conducted at NSC Charleston, SC.

At this writing, Module V is not in active use at any of the NAVADS sites since it is still under development.

Module V was conceived to be two distinct operations; one system to move material from one activity to another (i.e., NSC to a docked ship, NARF, or NSY): and the other system to move material around within an activity (i.e., from packing area to warehouse area within an NSC compound).

Material to be moved from one activity to another is split into two sub-activities, AVS I and AVS II. AVS I is used for scheduling routine deliveries to various activities. AVS II is used to provide for emergency issue deliveries and pick ups of material.

Within Subsystem III there are two major reports which are used to list shipments available for local delivery. These are the Shipment Scheduled for Local Delivery (On-Line) and Shipments Scheduled for Local Delivery (Batch). These programs list the shipments available for local delivery by keying on local area UIC's and providing relevant delivery informations: REQ.SCN, PROJ CODE, RDD, Date to Packing, Pack Location, Est. Weight and Cube. Susbystem III Programs VØ119Ø (On-Line) and VLOCDL (Batch) obtain information for its

reports from the (TAPS/DM(ØØ1)) file and reports all requisitions with modes "X" or "9" that do not have a proof of shipment flag.

Local delivery vehicular scheduling is still done today on a manual basis by a delivery dispatcher with little or no automated assistance. Module V, if used as originally envisioned as an AVS, will allow the user-dispatcher to plan deliveries according to a listing of activity UIC's with material available for delivery and of vehicles capable of delivering the material staged for local delivery.

On the whole, vehicular scheduling is extremely dependent on local conditions or regional environment. It is far too area specialized to attempt a standardization of decision making by use of packaged vehicle placement and scheduling systems.

Most decisions, made on an hour to hour basis by local dispatchers, are highly dependent on many human variables that may not be manageable by strict adherence to a machine generated framework of operating patterns. Vehicular availability, accidents, breakdowns, personnel deficiencies (foreseen and unforeseen), and so on make vehicle and delivery scheduling matching an almost "ad hoc" affair, based totally on human initiative and decision making.

F. SPLICE OPERATIONS WITHIN NAVADS

NAVADS will operate within a communications protocol called the Stock Point Logistics Integrated Communications

Environment (SPLICE). The SPLICE minicomputer will act as the front end communications processor for the Burroughs Medium System which will maintain and structure the stock point basic data package. Dr. Norman Schneidewind states [Ref. 6:p. 22]:

> "Two major objectives led to the development of SPLICE: first; the increased need for the use of interactive data base processing to replace the current batch-oriented system; second, the need to standardize the current multitude of interfaces."

The Burroughs Medium System (UADPS-SP) will also interface with AUTODIN (to eventually be superceded by the Defense Data Network (DDN) upon full implementation of SPLICE) to process incoming requisitions from other DOD activities. Additionally it will update the data files, send the required data elements for the formulation of workload reports and shipping requirements to NAVADS, and pass the material issue and packing orders to the NISTARS system.

A present difficulty with NAVADS, as it presently operates, centers around the access time anomalies that occur when a real-time system is placed in an interface-dependent relationship with a system that is batch-oriented. The original specifications for NAVADS required a three to five second response time for CRT operations. Screen response times, at peak loads, have been timed from twenty seconds to as much as forty seconds depending on the type of file manipulation requested. One cause is that file structures going through the look-ahead software feature must be accessed twice for each transaction.

This feature had been installed to protect master files from being altered, damaged, or segmented during the accessing process. The first access is used for record retrieval, establishing file locks, and performing file integrity checks. The second access is used to perform the actual transactions. Between file accessing for inquiries, changes, additions, and local and master file updates a condition called "thrashing" can occur. Consequently, accounting for NAVADS' twenty-three master files and forty-two index keys, it is easy to see why thrashing can occur, particularly when all key files that have been called or modified in some way must be re-collated in order to put the new or modified file back in place. All this must be accomplished before a new transaction can be processed. This is a primary area of conflict where real-time access capability conflicts with inverted list data and file structures which require sort and re-sort protocols.

With the introduction of TAPS II, and its ability to integrate data, this problem may be reduced. However, so long as NAVADS-SPLICE and NISTARS-TANDEM are required to interact with a batch oriented mainframe system, processing will continue to be only as fast as the slowest machine. The sort protocols and key access schemes will eventually lead to saturation of hardware memory and storage assets. To solve this dilema UADPS-SP should be prioritized for replacement by a real-time, on-line hardware system that is fully compatible to the TANDEM systems installed for NAVADS-SPLICE and NISTARS.

G. TERMINAL APPLICATION PROCESSING SYSTEM (TAPS)

TAPS is a proprietary software system resident within the Subsystem III hardware responsible for Module III, IV, and V operations. Its function is to act as a database manager and data manipulator for those files accessed from the Burroughs Medium System - Subsystem II, Module II operation. TAPS, as well, is responsible for the real time, on line operation of the NAVADS terminals. There are 3 major management modules within the TAPS framework.

TAPS (AM) - is the Applications Management module, which extracts input data from off the CRT screen format images, validates the data for correctness and completion and forwards the data to the TAPS (DM) module.

TAPS (CM) - is a multi function Communications Management module which monitors terminal traffic and throughput and operates the I/O polling of the LAN CRT's within NAVADS. TAPS (CM) interfaces with the INS software system which provides a logical multidrop network environment to overcome hardware connection limitations. All terminals interface with the TAPS (CM) module only through the INS software.

TAPS (DM) - is the Data Management system (resident DBMS) utilized to both manage and manipulate data called in from a file queue provided by the Management Control System. Entry into the Subsystem I, Module I database is done by Subsystem II, Module II via VISAM (Variable Index Sequential Access Method) which uses an index key access system to enter the

database and construct the required records or inquiries into structured, logical files. The structured logical file is then drawn from Subsystem II into Subsystem III by the TAPS (DM) file system and accessed, manipulated, or changed in accordance with the protocol or sub program call requested.

In the pre-SPLICE environment, operations are conducted on a Perkin-Elmer mainframe for all Subsystem III related processing. TAPS (or TAPS I) operates the peripherals and manipulates the required files for Module III, IV and V operations.

In the eventual, final configuration, with NAVADS integrated into the SPLICE Local Area Network (LAN), which is resident within the Tandem hardware system, the TAPS I system will be replaced by the TAPS II. TAPS II is primarily designed for operation on a TANDEM system and engineered to interface with the TANDEM native imbedded GUARDIAN/ENSCRIBE database management system (DBMS). TAPS II is designed to be a fully portable, machine to machine software system, written in a High Order Language (HOL) for versatility, in this case PASCAL.

TAPS I is a more machine-esoteric, dependent software system, written in Assembly Language and adapted over to the Perkin-Elmer operating system. A generalized software system, machine independent and written in an HOL, such as TAPS II, lends a greater degree of failsoft capabilities and post failure recoverability. As well, maintenance on the software is

easier and updates tend towards faster dissemination and implementation because of the level of standardization inherent in generalized software operations. Software maintainability is fast becoming a closely scrutinized area of ADP development by audit and oversight agencies, since software maintenance accounts for over seventy per cent of all life cycle management costs for a typical ADP project.

VI. SURVEY OF CIVILIAN EXPRESS CARRIER ADP METHODS

NAVADS operates within the military operating environment. Efficiency and end strength savings in personnel, administrative costs, and effectiveness are its primary measurement parameters. Conforming to UMMIPS timeframes and MILSTAMP/MILSTRIP mandates are other substantive measurements in determining the system's worth to the naval logistics establishment.

In recent times the civilian business community has also demanded a system of freight and small package express delivery. This is an outgrowth from businesses recognizing that their responsibilities are rising commensurately with fiscal competition. This makes communications and delivery of business related material or inventory to customers important in terms of temporal timeframes.

Several major, civilian freight express corporations have become industry leaders in providing freight and small package (or packet) overnight delivery services. One can draw significant parallels between their operations and the operations of Navy Stock Points. Approximately seventy per cent of all issues and shipments from an NSC can be classified as small packages (or packets) designated for local delivery, UPS, Parcel Post or bulk Mail delivery. Since express companies must measure their efficiency and efficacy in terms of profit and loss statements and balance sheets, it is within

their critical interests to reduce costly, manual labor and logic intensive operations. To accomplish this they have turned to the use of automated transportation systems to receive, consolidate, track, route, and ship packages placed into their responsibility.

A brief review of the ADP structure and operations of a civilian express firm follows. Comparisons to the ADP operations and structures of the NAVADS system at Navy Stock Points with the civilian firm may provide a valuable insight into performance methods.

A. AIRBORNE FREIGHT CORPORATION

The AIRBORNE FREIGHT CORPORATION of Seattle, Washington, utilizes a transportation control system called FREIGHT ON-LINE CONTROL AND UPDATE SYSTEM (FOCUS). FOCUS operates on dedicated IBM 3083 MVS/SN/CICS hardware, using an IBM 3705 NCP/EP communications processor linked to modems with signals sent out over a leased line network and a number of "IN-WATS" lines. Terminals in the system are IBM 3270 BSC's but the system has multiple protocol capabilities for terminal operations via Personal Computers (PC), IBM 2780 BSC access and a variety of message switching operations. Storage for on-line operations is accomplished on IBM 3380 disc drives as per the AIRBORNE hardware documentation [Ref. 7].

AIRBORNE uses a 26 function Shipment Life Cycle (SLC), consisting of 12 outbound material functions, and 14 inbound

material functions. With this SLC, AIRBORNE ensures that the manual functions connected with the pick-up, transfer, shipment, and delivery of freight is properly documented, accounted for, and input into the FOCUS system.

At AIRBORNE each AIRBORNE AIRBILL is assigned to a consolidation. These consolidations or groups of AIRBORNE AIRBILLS are called AIRLINE AIRBILLS. This airbill package is referred to as a "consol", this is similar to NAVADS' consolidating the individual REQ.SCN's into SU.SCN's.

The AIRBORNE AIRBILLS are read into FOCUS via the on-line entry transaction ARBE. ARBE is the initial entry transaction performed on material to "bring it onboard" the system. ARBE creates the AIRLINE AIRBILL, performs AIRBORNE AIRBILL transfers, accesses in the clear customer's name and address from a key code (much like the UIC relationship to the NNF in NAVADS). ARBE also calculates charges and flight weights, generates messages and appends AIRLINE and AIRBORNE AIRBILLS to the ZIP CODE ROUTING SUBSYSTEM (ZCRS).

The Shipment Tracking feature of FOCUS has 6 interactive transaction functions, as per the AIRBORNE software documentation [Ref. 8].

ARBE - as discussed above is the initial entry interactive routine for new shipments entering the SLC.

ABTD - Airbill Tracing Display--here the user inputs the airbill number and shipment origin; system display returns shipper, consignee and third party name and address information as well as shipment movement and delivery information.

ABCD - Airbill Charges Display--here the user inputs the airbill number and shipment origin, system display returns shipper, consignee and third party name and address information along with charges for the shipment.

CNDP - Consol Display--here the user inputs the airline code number, origin and AIRLINE AIRBILL number; system display returns all information concerning a particular consolidation, including flight information and the airbill keys for each AIRBORNE AIRBILL in the consolidation.

CNRD - Consol Reference Display--does the same as CNDP, but here the user can opt for an ABTD or ABCD transaction inquiry response for information on that consol.

CUST - Customer Number Display--here the user inputs a customer's account number and is hown a list of shipments for that customer. The user can then request ABTD or ABCD information on those shipments.

Updates to master on-line records are done from log-files which are created after an update action on a record. These log-files are extracted 4 times daily from the system and loaded to a master tape file. This information is processed and the results are fed back to the on-line systems. The following transactions are used to perform the updates on those extracts, resulting in the processed information returning to the system.

CNAU - Customer Name and Address Update--customer numbers are assigned to shippers, consignees and "bill to" parties that previously had no customer numbers or key codes assigned to them and were therefore keyed as exceptional and extracted.

MWAC - AIRBORNE EXPRESS Airline Costing--all consolidations for AIRBORNE EXPRESS are processed here to calculate airline cost for each consolidation. These updated consolidation costs are returned to the on-line system.

CINV - Centralized Invoice Pricing--when the airbill and the "bill to" party has its customer number, the invoice is printed here by this routine. The on-line files are updated with the print date and time of the invoice print.

OLAC - On line Accounting--consol dates that have been passed onto accounting have the accounting date applied here.

OLFP - On-line File Purge--this function reviews all candidate records for purging and then performs the actual purge operation.

The database structure for AIRBORNE is the result of AIRBORNE's committment to Data Base Technology. The database, using IBM's Data Base Management System, was phased in gradually. The previously used BDAM (Basic Direct Access Method) was phased out altogether as the IMS database environment took over all field operations and supervision of AIRBORNE's 43 production databases. The database disc utilization structure for the IBM 3380's as projected for March 1984 are in Table 16.

B. COMPARATIVE VIEW

Unlike the NAVADS sites, civilian express companies limit what they can accept as deliverable material. These restrictions usually center on girth dimensions, weight, and whether or not the destination is within one of their covered delivery areas. NAVADS stock points are faced with a variety of bulk, oversized, hazardous, and security sensitive materials that may have a potential delivery point anywhere in the world where there is a potential military demand.

Additionally, a civilian express firm is not limited in its ADP acquisition process by the constraints imposed by Acts of Congress. Life cycle management, as well as development life cycle reporting, is limited only by the rules and

procedures set down by the individual information systems or data processing departments within the organization's own hierarchy. In the Navy, as well as throughout the Federal Government, all hardware and major software acquisition is governed by the recently adopted Federal Acquisition Regulations (FAR). This compendium of regulations governs all aspects of the life cycle, development cycle, and contractual processes in requesting, awarding, implementing, and installing new ADP systems.

In operation, the commonality in the formation of AIRBORNE "consols" and NAVADS Shipment Units is striking. NAVADS has the advantage, however, in the variety of shipment modes that can be selected commensurate with the Issue Priority Group (IPS) required by the customer. AIRBORNE relies heavily on organic high cost, self-operated air and overland surface modes and on contractual air freight arrangements with other commercial airline operations. There is no priority selection option, it is assumed that if AIRBORNE was called, then shipment is of a "Priority One" nature. This, of course, generates a consistent, high cost per movement-unit overhead, making missed or lost shipments extremely costly.

NAVADS, unlike its civilian counterparts in private industry, has extensive collateral duties involved in inventory records keeping and issue control with UADPS-SP and NISTARS. AIRBORNE's system and similar other systems are only responsible for freight tracking, documentation and shipment.

VII. CONCLUSIONS AND RECOMMENDATIONS

A. OVERVIEW

NAVADS is a positive step by the Navy to take advantage of the trends in data processing technology. Real time operations, system transparency, and user-friendly designed systems are slowly superceding the older batch and card centered methods of accomplishing logistics management.

NAVADS, through the auspices of SPLICE, will soon allow greater flexibility in communications as it brings the Naval Supply System closer to achieving access to the Defense Data Network (DDN), eventually phasing out the need for dependence on the older AUTODIN network. It will free up main system assets by providing for front-end and back-end communications processing and protocol management for real time updates and other point-to-point communications.

This system will allow users, managers and planners to concentrate on the management of exception transactions and to leave the vast portion of transactions which are routine to the system.

B. LOCAL DELIVERY (MODULE V) ALTERNATIVES

Module V may be best put to use not as a local delivery scheduler, but as an automated documentation module for local deliveries in order to relieve Module III of some of the

burden of tracking, documenting, and establishing POS certifications for all outgoing material. It may be of long term benefit to allow Subsystem II to turn over all consolidated shipments with Shipment Modes of "X" (Bearer-Walk Throughs) and "9" (Local Delivery) to Module V. After release of the selected requisitions from the NIF, Subsystem II would consolidate the shipments, assign the REQ.SCN numbers, and select the mode of shipment. Pick and packing procedures would occur as with any other issue of material. If, however, the material being readied for shipment has a Shipment Mode of "9", the REQ.SCN records would be shifted to Module V for further consolidation into SU.SCN's by local activity UIC groupings. After the REQ.SCN's have been consolidated into SU.SCN's by UIC the material shipment would leave packing and go to the local delivery shipping warehouse, where, like other pieces of freight, a shipping floor location update would be performed. When this is done and all corrections, additions, and deletions have been made, Module V would then automatically produce an LBL (Local Bill of Lading) on the shipping floor. The LBL (a DD-1149m) would list a "MARK FOR" address and list each document and REQ.SCN included in that particular local shipment unit for that activity. The LBL production program would then automatically update the Proof of Shipment (POS) file and update the historical files indicating that the material was shipped and that the record is closed.

This same process would happen much in the same way for Shipment Mode "X" or Bearer Walk-Thru requisitions. Since the NIF would not be involved here, the system would accept the requisition for processing immediately (assuming it is an IPG I requirement needing a bearer walk-thru).

The material would process through all of the subsystems as any other walk-thru requirement. The mode "X" selection items would be picked, packaged, and sent to the bearer walk-thru pick-up desk. At this time the REQ.SCN record would be residing in Module V. When the customer picks up the material the user will call up the REQ.SCN on the CRT and, using a variation of the Shipping Floor Location Update scheme, input the SSN of the person picking up the material. As with the GBL/CBL and the proposed LBL production methods, the input of the receiving person's SSN would establish a POS record and update the historical files and close out that particular REQ.SCN.

Using Module V in this manner would be far more beneficial than attempting to use it in a more trivial manner as in operation of an AVS. ABS can be done more economically and with less waste of mainframe resources by utilizing a personal desk top micro-computer. This would leave Module V to do tracking and POS file operations on local delivery issues.

C. REMOTE ACCESS SURVIVABLE PROCESSING (RASP)

The first area of concern regarding unauthorized scrutiny of the NAVADS files can be dealt with by initiating various security methods to ensure secure use. These methods can include measures such as encryption, restricted use terminals, or queue delaying requests for itnerception, inspection and clearance of requesting access terminals, users or nodes. Various methodologies are available and should be studied for the protection of system information. These precautions would be in addition to the present user access codes, passwords, and identification methods imbedded within the TAPS (CM) system.

The second area of security regarding the potential for damage or destruction of hardware or peripheral devices due to an act of terrorism, war, or, as is much more likely, a natural disaster is a real-world concern for large ADP operations such as NAVADS.

To solve this matter, the NAVADS program should consider an additional two NAVADS--full up sites beyond the sites being developed for the NSC's. The two sites would be split; one western site to provide redundant services for NSC Puget Sound, NSC Oakland and NSC San Diego; and another site for eastern operations for NSC Norfolk, NSC Charleston and NSC Jacksonville. The RASP sites would provide back-up processing services for the stock points for periods of extended emergent and non-emergent downtime periods.

These RASP sites would be located in remote, low profile, geologically, and politically stable areas. Urban areas and regions with military establishments would be avoided. The RASP sites would be provided with TANDEM-SPLICE hardware for SUBSYSTEM III support and UADPS-SP for SUBSYSTEM I and II support (whichever UADPS-SP hardware system is in use at the time). Extensive secondary storage would be provided so that records can be mass stored to the capacity necessary to hold backup records for three stock points. The eastern RASP site would act as the master file maintenance site in the event that the NSC Norfolk-NAVADS site goes down. All routine updates would be distributed to the RASP sites as well as to all the NAVADS sites in order to keep the PASP sites current. RASP sites would be hardened sites with full AUTODIN (and eventually, through the auspices of SPLICE, full DDN capability) in order to receive the daily updates for each of the NSC's records under their purview as kept in their mass storage facilities. The result is that each of the NAVADS sites would have fully tailored data and file redundant back-up, not greater than twenty four hours old, available at their RASP site. If a NAVADS site goes down, the RASP site can provide NAVADS-type services by remote, through DDN terminal real time access. RASP would download all its held records for that NAVADS site when the stock point NAVADS facilities are back up. Every twenty four hours at staggered periods, each NAVADS site would transmit updated CRIF, NNF, NFF, NEF,

NIF, and NXF files to the RASP site, as well as the latest version of the nineteen SUBSYSTEM III TAPS(DM) files. POS, Historical Files, and all air challenge and air clearance files would also have their updated versions transmitted to the RASP sites every twenty four hours. Eventually, it can be envisioned that, the RASP sites would be updated on a real-time, transaction by transaction basis rather than on a twenty four hour batch update basis.

Remote and redundant ADP operations and archival storage are the substantive, current issues of today as the computer becomes the heart and brain of complex organizationa. Accidental or purposeful loss of processing capability without back-up can result in a long, virtually impossible road back to a recovered state.

D. EPILOGUE

This thesis has given a brief overview of the NAVADS system. It has included an historical survey of its origins, a brief walk-through of its three subsystems, and a look at current issues and future implications facing the system as it now stands and as it will stand in its final configuration.

Despite the restrictions of the Federal ADP procurement procedures and the overpowering technological march in ADP hardware, NAVADS in the Navy Supply Corps makes a substantive contribution towards bringing the naval service into the world of 21st century logistics management. Real-time, on-line physical distribution is evolving into reality, leaving

behind their analog-batch progenitors. The trinity of UADPS-SP, NAVADS and NISTARS, existing under the SPLICE communications umbrella will ensure proper growth with commensurate technological capabilities necessary to meet the relentless demands placed upon the Navy Supply System well into the next century.

APPENDIX A

SUBSYSTEM I AND II PROGRAM SUMMARY

1. J-XJ1A - is the NAVADS Cargo Routing Information File Maintenance File (CRIFMF) program. This program receives input, via AUTODIN, from NAVMTO to make changes, additions, deletions or updates to records in the CRIF. The program then outputs a CRIF Update and Error Report that provides documentation of the changes.

2. J-XJ1B - The NAVADS Real-Time NFF/NNF Update Program, which allows updates to the file via CRT or by auxiliary input via card and tape.

3. J-XJ1C - The NAVADS NFF Update Program accepts NFF updates from UADPS-SP for new Master Stock Item Record (MSIR) additions and from AUTODIN to apply NSC Norfolk Master NFF updates to those NIINs stocked by that particular NAVADS site. Additionally, Freight Classification updates from DLSC and Hazardous Cargo Information from the Defense General Supply Center (DGSC), Richmond, VA are received and inputted to NAVADS via this program.

4. J-XJ1D - The NAVADS NFF/NNF/HMIS/DLSC Update Reformat Program accepts three types of inputs plus a program control card. The first are the NFF AUTODIN Update Transactions (J-XJ1DA) which are cumulative updates made by other NAVADS sites to the master NFF at NSC Norfolk, VA. The second is the Master NFF Freight Classification Updates (J-JX1DJ) used only by NSC Norfolk to receive and input Freight Classification updates received from DLSC. The third is the Hazardous Information updates from DGSC, used by NSC Norfolk only, received via a quarterly tape transmission. If any of these updates are for NAVADS interest or stocked items at particular NAVADS sites, the information is written to the J-JX1C update queue files. Parameter control card J-XJ2DA denotes what input is in the program for current updating.

5. J-Xj1E - The NAVADS NFF Annual Purge Programs, for other than the master site at NSC Norfolk, screens the NIIN Check File against the NFF. Those NIINs found not to be a stocked item at the NAVADS site are purged and sent to the NFF Purge Trigger File. This is done to make room in the BDP for new items by removing inactive records. This purge also removes those NIIN records from the NFF that are no longer stocked at the site due to lack of demand.

6. J-XJ1F - The NAVADS Annual Purge Program, for the master site at Norfolk only, uses the Purge Trigger File from the individual NAVADS sites to determine which records should be purged from the master NFF.

7. J-XJ1G - The NAVADS NNF Update Program accepts updates for addresses from a disk queue file. These updated files represent changes to the NNF via characteristics generated either locally by the SPLICE minicomputer (presently the Perkin-Elmer minicomputer) or from updates received from DAASO. This program produces file update listings, purge file listings and separate printed section listings for corrections or updates forwarded by DAASO or the local NAVADS minicomputer.

8. J-XJ2A - NAVADS NEF Scan Program scans the NAVADS Exception File (NEF) which, as mentioned before, is a holding or scratch file containing entries of an exceptional nature which require further system processing or attention. This program produces five major outputs as a result of the system scan of the NEF and the user selected parameters as input via the Parameter Control Cards (PCC) and System Constant Area (SCA) parameters. The first of these is the Air Challenge Listing which produces a listing of shipments which do not meet air challenge criteria and therefore should be challenged as being unfit or unqualified for air transportation. The second listing is the NAVADS Exception Listing, it is used to list data base deficiencies during J-XJ1B and J-XJ1C program operations. Data elements in the BDP (the CRIF, NNF and NFF) that are missing or defective are reported as well as any processing errors which may have occured in the operation of the subsystem. Also this listing identifies exception shipments that have been identified for Military Airlift Command (MAC) transportation. The third listing, the NFF Updates, outputs only at NSC Norfolk and are used in file maintenance site updates. The fourth function is the production of ATCMD cards for those transactions that have been subject to a CRT Real-Time change to the mode of shipment on the NAVADS minicomputer and require further or special transportation clearance via AUTODIN. The last listing produced by the NEF Scan Program is the NAVADS Packing List. This is a record listing created for each multi-pack created by the Shipment Consolidation Program (J-XJ2I) as issues are released from the NAVADS Issue File (NIF) where IPG II and III requisitions are held commensurate with workload demands. The listing is used to ensure that a shipping unit is packed and consolidated together properly and to ensure that all data elements are correct and complete.

9. J-XJ2B - NAVADS Real Time Issue Processing Program handles CRT inputs for issues, cancellations, and modifiers in the real time mode and accepts any batch issue requests for high

priority and air eligible requisitions. In the BDP environment the NFF outputs freight classifications and hazardous material information via CRT or printed output. In the MCS environment, as opposed to the BDP environment, this program has seven major functions. The first, of course, is to process requisition modifiers and cancellations by searching elements and files of both Subsystems II and III, specifically the NIF, the Shipment Control Files (SCF), and the Requisition Data Files (TAPS/DM(ØØ1)) and performing the necessary changes or cancellations. The second function is the assignment of Shipment Control Numbers (SCN) to the requisitions received for action by the system except those designated for Local Delivery, Bearer Walk-Throughs, Parcel Post or UPS. The third function performs via program J-XJ2B interaction with the MCS in the selection of shipping modes. The options for shipment mode selection are shown in Table 5 as extracted from the NAVADS Users Manual [Ref. 5:pp. 3-61]. The fourth function is the selection of the air and surface routing channels to be utilized for a shipment to a particular UIC. The routing channel becomes an overriding informational component of the shipping unit record. The NAVADS local site matches NNF UIC entities to the CRIF and matches cutoff dates to the appropriate routing channel, (four air, four surface; in fields 41-548 (Air) and fields 552-1059 (Surface)). The fifth function is air challenge processing allowing each NAVADS site to become its own decentralized Air Clearance Authority (ACA) for Naval units. This allows shipments to be directly cleared into NAVMTO for movement into the military air freight system. The sixth function is the printing of the DD 1348-1 issue documents at terminals in the issuing warehouses. The final function of this program within the MCS is the writing of exception data consisting of missing or incomplete file records to the NEF that are discrovered during Subsystem II processing.

10. J-XJ2C - NAVADS Batch Issue Program processes UADPS-SP batch issues handling inputs for issues, cancellation, and modifiers via card, magnetic tape, or AUTODIN batch media. As in J-XJ2B the batch issue program utilized BDP information for creating shipping related listings and documents. In the MCS environment the program performs all those functions found in the real time process: SCN assignments, mode selection, NEF file writes, air challenge advisories to NAVMTO, and selection of routing channels for both air and surface modes. The batch issue program, through appropriate parameter cards, decides which requisitions go to the NAVADS Issue File (NIF). It should be noted that NAVADS only permits IPG II and III requisitions to go on the NIF queue file, IPG I requirements, "HI-PRI", do not qualify for entry onto the NIF since queue waiting time may adversely affect meeting UMMIPS time frames. Air eligible, high priority documents are normally passed from the batch to the real time processing program for system entry.

The major NAVADS output from this program is a magnetic tape of DD 1348-1 images for later transmission to warehouse locations when the workload permits processing of IPG II and III requisition issues. Three other remaining functions relate to interface operations with the UADPS-SP system itself. Briefly, the first is the creation of the NAVADS Cross-Reference File (NXF) which is a parallel record of the NIF, but only utilized by the UADPS-SP Physical Inventory Application. The second is the writing of a DOCID "ZAU" record for inventory issues that were processed directly without passing through the NIF. Lastly is a write function placing issue records on a queue for later processing by UADPS-SP to update the Inventory Suspense File.

11. J-XJ2D - NAVADS DD 1348-1 Print Program uses the Batch Issue Program and the Shipment Consolidation Program magnetic tape outputs as input to produce DD 1348-1 Issue Documents. A PCC card directs the sequence of DD 1348-1 document production in order to ensure shipment unit packing integrity or to queue output in some other specified or sequenced order.

12. J-XJ2E - NAVADS NIF/NXF Reconciliation Program ensures that the NIF and NXF are in agreement. Three options are available: NIF/NXF reconciliation, NXF/NIF reconciliation, and mutual reconsiliation. The NIF is logically assumed to be the master file, additions and deletions are performed only on the NXF. Option choices are determined by PCC card. There are two outputs; a NAVADS Cross Reference File (Updated) and an NXF Update Listing which lists all changes made against the NXF.

13. J-XJ2F - NAVADS Process Change Location Program allows the MCS to process warehouse location changes on all those records being held in the NIF for consolidation or for workload considerations. All locations, primary, secondary and tertiary are changed. This is to ensure that all documentation reflects proper warehouse locations when the records are drawn for hardcopy off the NIF. This producrs two outputs, the NAVADS Issue File (Updated) and the NIF Updates and Exceptions Listing which prints a list of any errors or exceptions encountered during the update process.

14. J-XJ2G - NAVADS Produced Daily Workload Planning File Program uses the NIF to produce Workload Planning Files which are used to generate the Workload Planning Reports. Using a sort routine, the NIF is processed and a scratch file is produced using sleected data elements in the NIF records. This sort file is in Area of Country, UIC and Warehouse Area format. Type "1" and "2" options summarize the number of requisitions, weight and cube for each warehouse area for individual UIC's. For the Type "2" option only, the Mandatory Issue Date (MID) is compared against the date on the input PCC card, and the

above summarizations are only given for documents with julian dates equal to or less than the date indicated on the PCC card.

15. J-XJ2H - NAVADS Shipment Workload Planning Report Program generates the Workload Planning Statistic Report, the Workload Planning Report and a special Commodity Report. The different report formats are generated by initiating various sort routines processed against the records. This allows output to be sequenced in appropriate order for the reports themselves.

16. J-XJ2I - NAVADS Shipment Consolidation Program uses the NFF, in the BDP environment, to provide information to determine consolidation limits based on the characteristics of the material to be shipped. In the MCS environment it is the core module central to NAVADS' ability to consolidate shipments into properly combined shipping units. J-XJ2I consolidates shipments and releases the requisitions from the NIF for picking and packing as a unitized, coordinated block of issues. Requisitions on the NIF can be supressed from release, selected for release or made ineligible for consolidation through the use of either a parameter card or a CRT card-imaged screen.

17. J-XJ32 - NATDS CRIF Maintenance Program, made available to NAVADS, is run on a daily basis after the J-XJ1A program is run. This dual running of both programs ensures that shipment cut off dates present in the CRIF represent only future dates. This process of clearing expried cut off dates for air and surface shipments from both the NAVADS and NATDS systems is called "rolling". The CRIF also interacts with the two issue input programs J-XJ2B and J-XJ2C so that proper routing or forwarding variables can be incorporated into the issuing, packing and material handling processes.

APPENDIX B

SUBSYSTEM III DOCUMENTATION PROGRAM DESCRIPTIONS

1. DD 1387 Military Shipping Label (NON-AIR) Program VØ2Ø4Ø accesses the Shipping Unit Data File (TAPS/DM(ØØ2)) function menu. The user reviews the UPDSHP Screen (ØØ2) to ensure that all of the required label data have been entered into the Shipment Unit record. The function image SHPLBL screen is then used at the CRT to input the SU.SCN and the number of shipping labels required per piece (usually one). Program VØ2Ø4Ø then uses the contents of the Shipment Unit Data File (UPDSHP) and the contents of the Shipment Label input (SHPLBL) to print the required labels at the remote sites in the warehouses. Screen (ØØ4) provides opportunity for corrections and Screen (Ø12) notifies the user that the action is completed. An example of a DD 1387 is in Table 9.

2. DD 1387 Military Shipping Label (AIR) Program VØ221Ø accesses the Shipment Unit Data File to ensure that the shipping unit record is complete and that the mode of shipment is either F, N, Q, R, T or U. A CHGMOD can be done here in case the mode does not conform to an air transport mode. The user must then access the file to ensure that all air challenges for the shipping unit in question have been cleared or resolved. The user selects the AIRLBL function and enters the SU.SCN and the number of labels per piece. Program VØ221Ø accepts all UPDSHP, CHGMOD and AIRLBL function input information and produces a DD 1387 (AIR) label at the warehouse remote site. Screen format (Ø21) is used to notify the user that the label has been transmitted.

3. The Notice of Availability (NOA) DD1348-5 Program VØ123Ø is the Access Data To Produce NOA routine. It utilizes 3 screen formats and programs VØ124Ø and VØ125Ø to execute online NOA document production. This program accesses (TAPS/DM (ØØ2)) file information which has the Shipment Control Number (SCN), shipping data and the code of the shipping office requesting a hard copy NOA. The user validates the shipping information as correct and complete and makes corrections as necessary.

4. Notice of Availability (NOA) DD 1348-5 Program VØ124Ø Print Notice of Availability, utilizes the data gathered by program VØ123Ø. Interaction now switches to (TAPS/DM(ØØ1)), VØ124Ø cues the user for the SU.SCN of the shipment for which the NOA is required and the code of the shipping office which requires the notification of material availability. The DD 1348-5 NOA is printed at the remote site-office indicated by the user.

5. Notice of Availability (NOA) DD 1348-5 Program VØ125Ø Update NOA File, is the routine which performs the on-line function NOAPRD, which produces NOA card images for AUTODIN transmission. Inputs to utility Screens Ø25 (corrections) and Ø26 (transaction completion) and information accumulated by programs VØ123Ø and VØ124Ø produce the hard copy NOA's except in the case of destination UIC's located in Germany, where, automatically, AUTODIN NOA's are produced and transmitted in place of hard copy documents.

6. GBL Normal Front Sheet Production Program VØ317Ø, (interactive function GLBNFS) produces a GBL (SF 1103-A) front sheet which requires a continuation sheet. Screen Ø17 of (TAPS/DM (ØØ3)) is utilized to display transportation unit information so that a user may make corrections to the file, on-line, directly on the CRT. The GBL Number is assigned from a block of numbers assigned to a particular NAVADS site. When the user transmits, a standard DOD nine part SF-1103-A is produced with all required block entries, accounting data and endorsements appropriately filled in, depending on the characteristics of the material being shipped. The program also posts the Proof of Delivery File and History Data File, thus closing out the transaction.

7. GBL Front Only Edit Program VØ324Ø is only used when a single front page is needed with no continuation pages required. This program displays GBL shipment data information to the user in GBL format. Screen Ø24 presents the GBL format to the user for corrections in case there is an error, Screen Ø25 displays the complete GBL for review and any additional corrections, Screen Ø26 indicates a completed GBL transaction.

8. GBL Front Only Print Program VØ325Ø program, completes the GBLOFS interactive function. An SF-11Ø3-A, requiring no continuing sheets, is printed at the remote site printer at the stock point shipping office.

9. GBL ALCO Front Page Print Program VØ335Ø is used to produce specially formatted GBL documents for California Consolidated (ALCO) shipments that will use continuation sheets. The interactive function GBLCFS is used for this function. ALCO requires special information on its GBL's for its multiple location deliveries. Screen Ø35 is used for corrections to the (ALCO) GBL record, Screen Ø36 is used for notification of a completed transaction. The hard copy is printed to a remote site printer at the stock point shipping office.

10. CBL Front Edit Program VØ33ØØ runs the interactive function CBLOFS with CRT Screens Ø3Ø and Ø31 to produce CRT information concerning record data of material within a

particular transportation unit when continuation sheets are not required. The user corrects CBL document information on Screen Ø3Ø and reviews data on Screen Ø31.

11. CBL Front Only Print VØ331Ø takes the information from Screen Ø31 and produces a hard copy CBL that does not require a continuation sheet. This program sends the 9-part hard copy to the shipping office, assigns a CBL number and posts the Proof of Delivery File, History Data File and any other records associated with the close out of a transportation unit.

12. CBL Normal Front Sheet Production Program (VØ332Ø) is used for the CBL's requiring a continuation sheet. The program utilizes function CBLNFS and Screen Ø22 and Ø23 of (TAPS/DM (ØØ3)) to produce a CBL for a particular transportation unit. Screen Ø22 displays a CRT image of the CBL and allows the user to make corrections or additions to information in the CBL's record. Screen Ø23 advises the user when the transaction is complete. The system also posts all POD and History File records and closes out the transportation unit. The program transmits a nine part CBL front sheet hard copy, for use by the shippers, to a remote printer.

13. Bill of Lading Continuation Sheet Print Program VØ315Ø uses CRT Screens Ø15, Ø16 and Ø19 of (TAPS/DM(ØØ3)) and function BLNCSH to produce the SF-11Ø9 Continuation Sheets. The nine-part DOD standard form is produced and transmitted to the shipping office upon completion (Table 13). The (TAPS/DM (ØØ3)) file is flagged with a check byte to show that a continuation sheet has been produced for a particular transportation unit. This flag allows the GBL and CBL normal front sheets to be produced when called up out of the ØØ3 file. The printing of the continuation sheets do not cue the posting of the Proof of Delivery and History Data Files, this is done only when the front sheets are produced. Screen Ø15 is ued when an error returns the record to the user for correction. Screen Ø16 is used to remove any cancelled requisitions from the Continuation Sheet record and to make necessary corrections or deletions, Screen Ø19 advises when the transaction is complete. The Continuation Sheets, SF-11Ø9's, are produced before the SF-11Ø3-A GBL front sheets and the CBL front sheets.

14. GBL Continuation Sheet for ALCO Shipments Program VØ333Ø, GBL ALCO Continuation Print. Here the CRT interactive function GBLCCS and Screen Ø33 and Ø34 operate to print the DOD SF-11Ø9-A ALCO Continuation Sheets. Upon production of the SF-11Ø9-A, a check flag is sent to the (TAPS/DMØØ3)) file for use by Program VØ335Ø to allow printing of the GBL-ALCO front page. Screen Ø33 displays up to 60 transportation unit numbers to be shipped on one GBL-ALCO document. Screen Ø34 advises that the transaction is complete and that the SF-11Ø9-A

sheets have been transmitted to the stock point shipping area remote terminal.

15. DD 1384 Transportation Control Movement Document (TCMD) Access for Update-TCMD Image Work File provides interactive access to transportation unit records for updating through function UPDTIW.

16. DD 1384 TCMD Update TCMD Image Work File Program V26Ø2Ø allows changes to records on the file.

17. DD 1384 Program V26Ø4Ø, Print-Transmit TCMD Document Program V26Ø4Ø allows printing, through interactive function TCMDPT, of hard copy TCMD DD-1384 documents. The program also transmits AUTODIN card images to a TCMD AUTODIN queue file for eventual transmission to the appropriate ACA or WTCA. The two other programs, V26Ø6Ø, Access for SCAN-TCMD Image Work File and V26Ø8Ø, Update-SCAN TCMD Image Work File are used to update record information for Transportation Unit TCMD's prior to their being printed via the interactive function TCMDPT.

TABLE 1

NAVADS FREIGHT CLASSIFICATION/HAZARDOUS FILE (NFF)
DATA FORMAT NAVADS SUBSYSTEM I AND II

Fields	Description
1-4	Federal Supply Class
5-13	NIIN
14-19	Nat MTR/FRT Class (NMFC) Code
20	Less Than Truckload (LTL)
21	Air Dimension Code
22	Data Last NFF Update - Year
23-25	Date Last NFF Update - Day
26	NAVMTO IND
27	NFF Confirm/Unconfirm IND
28-30	Water Commodity Code
31	Type Cargo Code
32	Special Handling Code
33-34	Air Commodity Spec Hndlg Code
35-69	Freight Description
70	Oversize Dimension IND
71-80	NFF Activity Stock Item IND
81-84	Net Weight
85-88	Net Cube
89-90	Hazard-Danger Cargo Code
91-93	United Nations Class Code
94-97	United Nations Number
98-122	DOT Label Primary
123-147	DOT Label Secondary
148-152	CFR Paragraph Spec Reqs
153-157	CFR Exceptions
158-207	CFR Shipping Name
208-257	CFR Shipping Name
258-273	Flashpoint
274-296	Hazard Class
297	CFR Paragraph 172-100 Symbol
298-320	AFR 71-4 Class
321-345	AFR 71-4 Label
346-350	AFR Packing Paragraph
351-352	Loading Storage Group
353-377	IMCO Label
378-384	Net Explosive Weight
385	Multiple ESC/PN IND
386-402	Filler
403-502	Additional Hazard Info
503-576	Filler

TABLE 2

NAVADS NAME AND ADDRESS FILE (NNF)
DATA FORMAT NAVADS SUBSYSTEM I AND II

Fields	Description
1	Service Designator Code
2-6	Unit Ident Code UIC
7-41	In Clear Parcel Post Address Line 1
42-76	In Clear Parcel Post Address Line 2
77-111	In Clear Parcel Post Address Line 3
112-146	In Clear Parcel Post Address Line 4
147-181	In Clear Parcel Post Address Line 5
182	Usual Air Mode
183	Usual Surface Mode
184-186	Aerial POE
187-189	Aerial POD
190-192	Water POE
193-195	Water POD
196-197	State Code
198	CONUS Georgraphic Area Code
199-201	CONUS Geographic Sub-Area Code
202-207	Standard Point Location Code
208-211	Government Bill of Lading Code
212-217	SHIP TO UIC
(212-217)	Break Bulk Alt SHIP TO UIC
218	Parcel Post Zone Code
219-393	In the Clear Freight Address
394	Local Delivery Code
395	Mode Restriction Code
396	Special Instruction IND
397	UPS Zone Code
398-432	Local Delivery Instructions
433-437	Date NNF Record Last Accessed
438-612	In the Clear MARK FOR Address
613-787	In the Clear NOA Address
788	Usual Air Small Parcel Mode
789	Usual Surface Small Parcel Mode
790-1200	Filler

TABLE 3

CARGO ROUTING INFORMATION FILE (CRIF)
DATA FORMAT NAVADS SUBSYSTEM I AND II

Fields	Description
1-6	Unit Identification Code
7	Type Activity
8-32	Activity Name/Hull Number
33-37	Last Air Update Action
38-40	Air Operator (CRT User) Channel #1 Data (AIR) (41-167)
41-43	Air Port of Embarkation APOE
44-46	Air Port of Debarkation APOD
47-50	Cut Off Date for Shipments
51-65	Information Source for CRIF
66-167	Additional Routing Information
168-294	Channel #2 Data (AIR)-same
295-421	Channel #3 Data (AIR)-same
422-548	Channel #4 Data (AIR)-same
549-551	Surface Operator (CRT User) Channel #1 Data (SURFACE)
552-554	Port of Embarkation POE
555-557	Port of Debarkation POD
558-561	Cut Off Date for Shipments
562-576	Information Source for CRIF
577-678	Additional Routing Information
679-805	Channel #2 Data (SURFACE)-same
806-932	Channel #3 Data (SURFACE)-same
933-1059	Channel #4 Data (SURFACE)-same
1060	Air Update Indicator
1061	Surface Update Indicator
1062-1066	Last Surface Update Action
1067-1083	Home Port/Shore Activity IND
1084-1200	Filler

TABLE 4

NAVADS EXCEPTION FILE (NEF)

NEF List of Sub Files are utilized for updating NAVADS site files and communicating with the Master File Maintenance Site at NSC Norfold:

ATCMD AUTODIN Record
NFF AUTODIN Record
Air Challenge Message
ATCMD AUTODIN Record Exception
CLF Exception Record
NFF Exception Record
Processing Exception Record
NNF Exception Record
Packing List Record
SCN Assignment Record

TABLE 5

NAVADS SUBSYSTEM II MODE SELECTION CRITERIA
Extract: UM-XJØ2 p. 3-61

1. Local Delivery (Mode 9) is assigned when the Local Delivery Indicator in the NNF is NOT a blank.

2. A (Mode *) Unable to Assign indicator is issued if the weight and cube data is missing from the NNF or the material is hazardous, oversized or security sensitive.

3. (Mode H) Air Parcel Post is assigned for IPG I and II requisitions which do not exceed 50 pounds, 4.2 cube and for which there is no Air Parcel Post Mode H restriction.

4. (MOde G) Surface Parcel Post is assigned to IPG III shipments where there is no Mode G restriction or parcel post restriction.

5. (Mode 5) UPS is assigned to IPG I, II, III shipments, when the restriction code are H or G (parcel post restricted) and the material is for a CONUS customer.

6. (Mode F) MAC is selected to overseas IPG I, II shipments where the UIC is not Mode F restricted, is not hazardous, oversize or security sensitive. Shipment must exceed 50 pounds and 4.2 cube.

7. (Mode Q) Commercial Air is selected for IPG I, II freight shipments when the UIC is Mode F restricted and is hazardous, oversize or security sensitive and exceeds 50 pounds and 4.2 cube.

8. (Mode N) LOGAIR is assigned to CONUS IPG I, II shipments when N is loaded in to Usual Air Mode for the UIC in the NNF and the weight is over 50 pounds and 4.2 cube.

9. (Mode #) CONTRUCK is assigned to IPG I, II shipments when "#" is loaded into the Usual Surface Mode for the UIC in the NNF. This code is used internal to stock points only since it is not a valid MILSTAMP code.

10. (Mode $) ALCO is assigned to CONUS IPG I, II shipments when "$" is loaded into the Usual Surface Shipment Mode for the UIC in the NNF and the weight and cube exceed parcel post limits. "$" is for internal use only.

11. (Mode U) QUICKTRANS is selected for CONUS IPG I, II freight shipments when the Usual Air Mode in the NNF is not

Table 5
NAVADS SUBSYSTEM II MODE SELECTION CRITERIA (cont'd)

N, # or $ and the weight and cube exceeds parcel post limits.

12. Mode of shipment of IPG III freight requisitions are assigned based on the mode loaded in to the Usual Surface Mode in the NNF. When the Usual Surface Mode byte is blank, the mode of shipment is assigned as follows:

a) CONUS Requisition Mode B Less Than Truck Load (LTL)

b) Overseas Requisition Mode V SEAVAN
(If item is not oversized, hazardous or security sensitive) if so;

c) Mode Z Breakbulk.

TABLE 6

NAVADS SUBSYSTEM II LISTINGS AND REPORTS
Extracted: UM-XJØ2 p. 2-26

Subsystem II Management Control Subsystem produces seven different printed listings and reports as a result of requisition processing and interaction with Subsystems I and III files. These reports are listed below:

1. Air Challenge Listing
2. NAVADS Exception Listing
3. NAVADS Packing List
4. DD 1348-1 Issue Documents
5. Workload Planning Statistics Listings
6. NAVADS Workload Planning Report
7. Actual Planning Report-Warehouse Area Statistics

TABLE 7

N /ADS SUBSYSTEM III INTERACTIVE FILES (TAPS/DM(XXX))
Extra :: UM-XJØ2 p. 3-80

1. T e Requisition Data File (TAPS/DM(ØØ1)) contains data perti ent to individual requisitons. Inquiries and updates for i lividual requisitions are processed in this with thise ' Indicator in the NNF is NOT a blank.

2. T e Shipment Unit Data File (TAPS/DM(ØØ2)) contains data conce ning single and multi-requisition shipment units. DD-13 ' labels are produced from this file, it also handles inqui es and updates concerning SU's.

3. T e Transportation Unit Data File (TAPS/DM(ØØ3)) holds data ertaining to shipment units grouped into Transportation Units This file takes care of transportation documentation, inqui es, and updates concerning TU's.

4. T e Hazardous Requisiton Data File (TAPS/DM(ØØ4)) contains extra equisition data for hazardous material inquiries and updat to hazardous item records.

5. T POE/POD Address File (TAPS/DM(ØØ5)) contains in-the-clear ddresses for Ports of Embarkation and Debarkation.

6. T Carrier Name File (TAPS/DM(ØØ6)) has in-the-clear freig carrier names and tonnage statistics.

7. T POS Shipment File (TAPS/DM(ØØ7)) is an interactive file eue that holds Proof of Shipment for Parcel Post, UPS, Local elivery and Bearer Walkthrough shipments. Shipments are h d in this queue and passed to UADPS during batch processi to update inventory records.

8. T Mobile Unit File (TAPS/DM(ØØ8)) contains routing channe s for mobile units.

9. T GBL History File (TAPS/DM(ØØ9)) holds a record for all G ernment Bills of Lading.

10. T Weight and Cube Overflow File (TAPS/DM(ØlØ)) contains weight and cube for shipment units that have more than five pieces in them.

Table 7
NAVADS SUBSYSTEM III INTERACTIVE FILES (TAPS/DM(XXX)) (cont'd)

11. The Miscellaneous File (TAPS/DM(Ø11)) is used to hold systems constants accessed at different points of the NAVADS interactive process.

12. Name and Address File (NNF) Updates (TAPS/DM(Ø13)) interactive method of sending Name and Address file changes to the NNF in Subsystem I.

13. Freight Classification File (NFF) Updates (TAPS/DM(Ø14)) interactive holding file used to send Freight Shipment changes to the NFF in Subsystem I.

14. The Freight History File (TAPS/DM(Ø15)) holds freight history records for shipments that have been processed out of the stock point.

15. The Parcel Post/Local Delivery Shipment History File (TAPS/DM(Ø16)) holds records for shipments that have been sent out to customers via Parcel Post, Local Delivery or UPS.

16. The Country Name File (TAPS/DM(Ø18)) contains in the clear country names linked to applicable country codes.

17. The Appropriations File (TAPS/DM(Ø2Ø)) contains appropriation line data in order to be accessed during the preparation of transportation documentation.

18. The Transshipment History File (TAPS/DM(Ø23)) contains a record entry for each transshipment sent out by the NAVADS activity.

19. The TCMD Work Image File (TAPS/DM(Ø26)) contains the data necessary to produce AUTODIN and hard copy TCMD documents (DD01384).

TABLE 8

NAVADS SUBSYSTEM III LISTINGS, REPORTS, AND DOCUMENTS
Extract: UM-XJØ2 p. 2-26

Subsystem III for Automated Documentation produces twenty-six different printed listings, reports, and documents as a result of user interaction with its file structure. These reports are listed below:

1. Shipments Scheduled for Local Delivery (On-line)
2. Notice of Availability (NOA) (DD 1348-5)
3. Military Shipment Label (DD 1387)
4. Loading Manifest (Batch and On-line)
5. GBL-CBL Continuation Sheets
6. GBL Front Sheet
7. CBL Front Sheet
8. Container Consist List
9. Transportation Control and Movement Document (TCMD) (DD 1384)
10. Local Delivery/Bearer Walkthrough Requisitions Without Proof of Shipment greater than 2 days old
11. Parcel Post/UPS Issues Without Proof of Shipment greater than 2 days old
12. Transshipment Report
13. Number of Requisitions by Mode
14. PPLDPS Exception Listing
15. Z98 DOCID generated from Proof of Shipment Error Report
16. Z98 DOCID Statistical Report
17. Actual Date to Packing Update Report
18. Sequential GBL Accountability Listing
19. Shipments Scheduled for Local Delivery (Batch)
20. Requisitions Late to Packing
21. Overaged/Delayed Shipment Unit Report
22. Requisitions Shipped Late
23. Transportation Units at Shipping Report
24. Tonnage Distribution Report
25. Challenged Status Report
26. TCMD Image Work File Purge Report

TABLE 9

DD-1387 SHIPPING LABEL

TRANSPORTATION CONTROL NUMBER	ROO	PROJECT
V52199 8348 0010 XXX	352	999

FROM:
N00189
NSC NORFOLK
NORFOLK, VIRGINIA

TRANS PRIORITY

TO: (POE when applicable)
NGU NORFOLK NAS
NORFOLK, VIRGINIA

POD (When applicable)
NAP NAPLES, ITALY

ULTIMATE CONSIGNEE OR MARK FOR
V52199 USS MANLEY DD940

TAC N287

PIECE NO.	TOTAL PIECES	WEIGHT THIS PIECE	CUBE THIS PIECE
1	1	83	5.2

DD FORM 1387. 1 APR 66 12ND NSC 4614/3 (TRAF) (4-78) MILITARY SHIPMENT LABEL

☆ U.S. GOVERNMENT PRINTING OFFICE 1979 754-475

TABLE 10

DD-1384-5 NOTICE OF AVAILABILITY

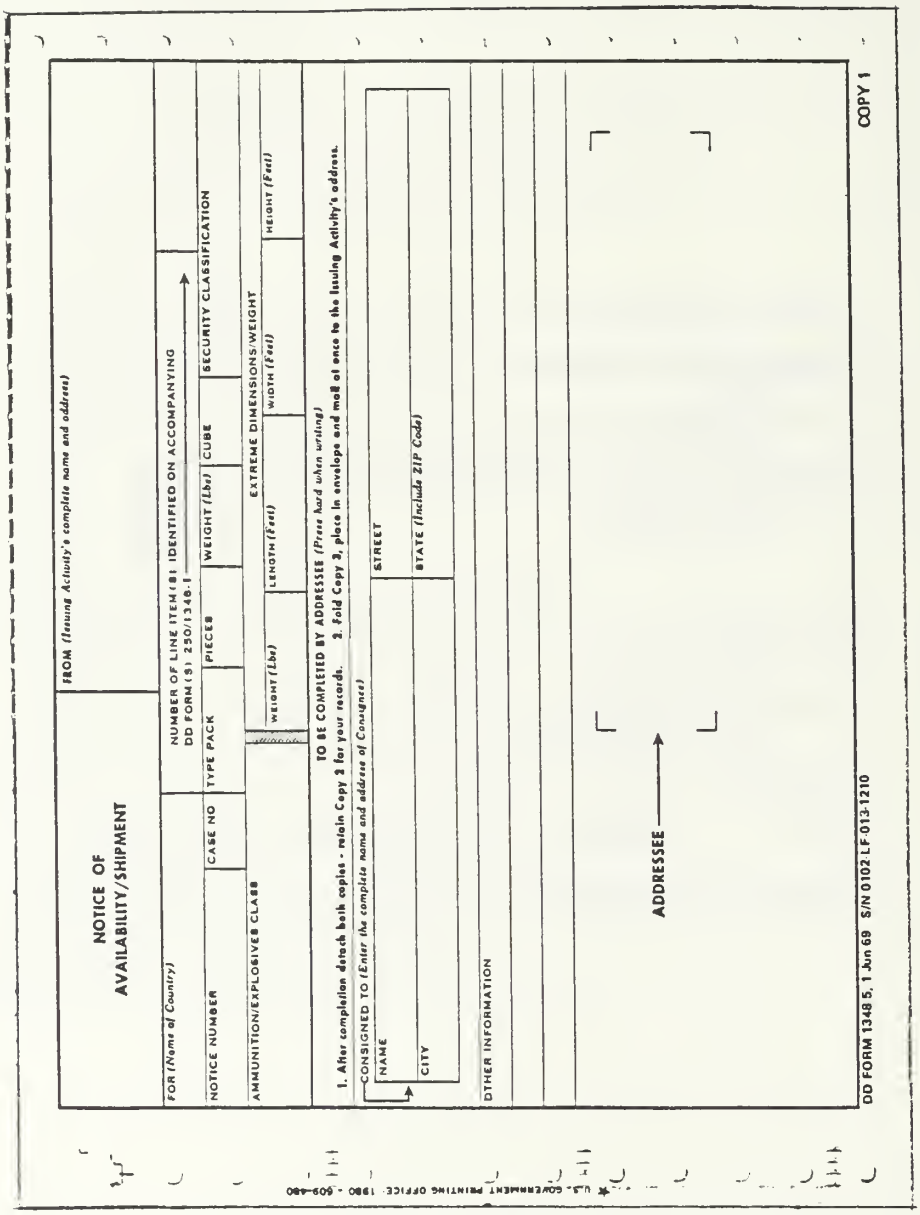
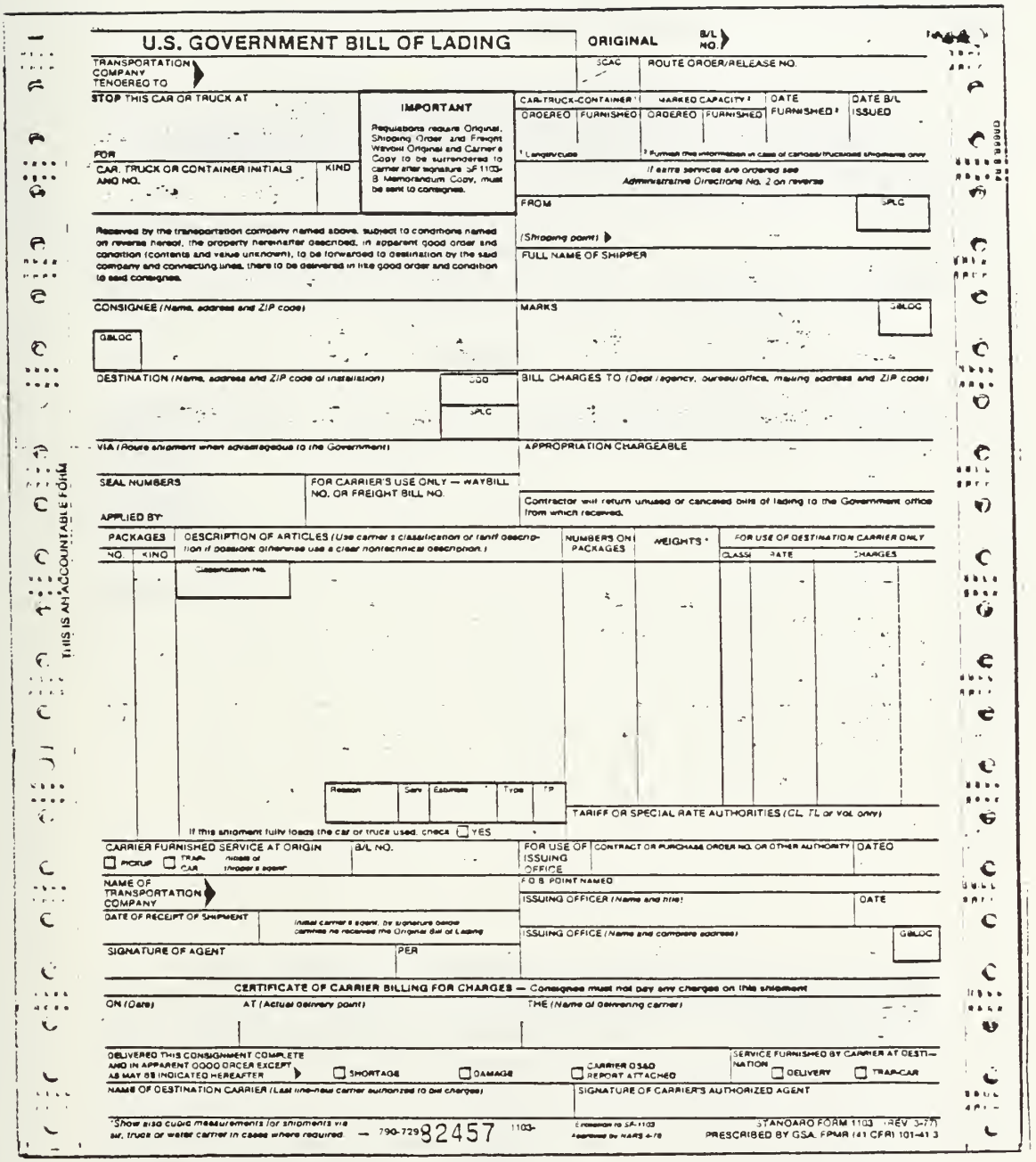

NOTICE OF AVAILABILITY/SHIPMENT
FROM (Issuing Activity's complete name and address)
FOR (Name of Country)
NUMBER OF LINE ITEM(S) IDENTIFIED ON ACCOMPANYING DD FORM(S) 250/1348-1
NOTICE NUMBER
CASE NO
TYPE PACK
PIECES
WEIGHT (Lbs)
CUBE
SECURITY CLASSIFICATION
AMMUNITION/EXPLOSIVES CLASS
EXTREME DIMENSIONS/WEIGHT
WEIGHT (Lbs)
LENGTH (Feet)
WIDTH (Feet)
HEIGHT (Feet)
TO BE COMPLETED BY ADDRESSEE (Press hard when writing)
1. After completion detach both copies - retain Copy 2 for your records. 2. Fold Copy 2, place in envelope and mail at once to the Issuing Activity's address.
CONSIGNED TO (Enter the complete name and address of Consignee)
NAME
CITY
STREET
STATE (Include ZIP Code)
OTHER INFORMATION
ADDRESSEE
DD FORM 1348 5, 1 Jun 69 S/N 0102 LF 013 1210
COPY 1
U.S. GOVERNMENT PRINTING OFFICE: 1980 - 609-480

TABLE 11

GOVERNMENT BILL OF LADING



U.S. GOVERNMENT BILL OF LADING

ORIGINAL

B/L NO.

TRANSPORTATION COMPANY TENDERED TO

SCAC

ROUTE ORDER/RELEASE NO.

STOP THIS CAR OR TRUCK AT

FOR

CAR, TRUCK OR CONTAINER INITIALS AND NO.

KIND

IMPORTANT

Regulations require Original, Shipping Order and Freight Waybill Original and Carrier's Copy to be surrendered to carrier after signature. SF 1103-B Memorandum Copy, must be sent to consignee.

CAR-TRUCK-CONTAINER [1] | MARKED CAPACITY [2] | DATE | DATE B/L

ORDERED | FURNISHED | ORDERED | FURNISHED | FURNISHED [2] | ISSUED

[1] Length/cube

[2] Furnish this information in case of carload/truckload shipments only

If extra services are ordered see Administrative Directions No. 2 on reverse

Received by the transportation company named above, subject to conditions named on reverse hereof, the property hereinafter described, in apparent good order and condition (contents and value unknown), to be forwarded to destination by the said company and connecting lines, there to be delivered in like good order and condition to said consignee.

FROM

SPLC

(Shipping point)

FULL NAME OF SHIPPER

CONSIGNEE (Name, address and ZIP code)

GBLOC

MARKS

GBLOC

DESTINATION (Name, address and ZIP code of installation)

DOD

SPLC

BILL CHARGES TO (Dept./agency, bureau/office, mailing address and ZIP code)

VIA (Route shipment when advantageous to the Government)

APPROPRIATION CHARGEABLE

SEAL NUMBERS

FOR CARRIER'S USE ONLY — WAYBILL NO. OR FREIGHT BILL NO.

APPLIED BY

Contractor will return unused or canceled bills of lading to the Government office from which received.

PACKAGES NO.	PACKAGES KIND	DESCRIPTION OF ARTICLES (Use carrier's classification or tariff description if possible; otherwise use a clear nontechnical description.)	NUMBERS ON PACKAGES	WEIGHTS *	FOR USE OF DESTINATION CARRIER ONLY CLASS	RATE	CHARGES
		Classification no.					

Reason	Serv	Estimate	Type	TP

TARIFF OR SPECIAL RATE AUTHORITIES (CL, TL or VOL only)

If this shipment fully loads the car or truck used, check ☐ YES

CARRIER FURNISHED SERVICE AT ORIGIN ☐ PICKUP ☐ TRANS. CAR (Name of shipper's agent)

B/L NO.

FOR USE OF ISSUING OFFICE

CONTRACT OR PURCHASE ORDER NO. OR OTHER AUTHORITY

DATED

NAME OF TRANSPORTATION COMPANY

F.O.B. POINT NAMED

ISSUING OFFICER (Name and title)

DATE

DATE OF RECEIPT OF SHIPMENT

(Initial carrier's agent, by signature hereto, certifies he received the Original Bill of Lading)

ISSUING OFFICE (Name and complete address)

GBLOC

SIGNATURE OF AGENT

PER

CERTIFICATE OF CARRIER BILLING FOR CHARGES — Consignee must not pay any charges on this shipment

ON (Date)

AT (Actual delivery point)

THE (Name of delivering carrier)

DELIVERED THIS CONSIGNMENT COMPLETE AND IN APPARENT GOOD ORDER EXCEPT AS MAY BE INDICATED HEREAFTER ☐ SHORTAGE ☐ DAMAGE ☐ CARRIER O.S.&D. REPORT ATTACHED

SERVICE FURNISHED BY CARRIER AT DESTINATION ☐ DELIVERY ☐ TRAP-CAR

NAME OF DESTINATION CARRIER (Last line-haul carrier authorized to bill charges)

SIGNATURE OF CARRIER'S AUTHORIZED AGENT

*Show also cubic measurements for shipments via air, truck or water carrier in cases where required. — 790-729 82457 1103-

Expiration to SF-1103 Approved by NARS 4-76

STANDARD FORM 1103 (REV. 3-77)

PRESCRIBED BY GSA, FPMR (41 CFR) 101-41.3

THIS IS AN ACCOUNTABLE FORM

TABLE 12

COMMERCIAL BILL OF LADING

STRAIGHT BILL OF LADING-DOMESTIC-ORIGINAL-NOT NEGOTIABLE

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading

The property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise to deliver to another carrier on the route to said destination. It is agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth in (1) Official Classification, Groups and Illinois Freight Classification effective on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said Bill of Lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Transportation Company Tendered To | Traffic Control No.

Consignee | From | Date B/L Issued

Full Name of Shipper

Destination | State Of

Marks

Via

Charges to be Billed to

PACKAGES No	PACKAGES Kind	DESCRIPTION OF ARTICLES (Use Carriers Classification or Tariff Description if Possible, Otherwise a Clear Nontechnical Description)	NUMBERS ON PACKAGES	WEIGHTS*	RATE	Check Column

Subject to Section 7 of conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

Per

(Signature of Consignor)

* If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." Show also cubic measurements for shipments weighing less than 1,000 lbs.

Tariff or Special Rate Authorities

NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ Per _____

NAME OF TRANSPORTATION COMPANY

Date of Receipt of Shipment

Initial Carrier or Agent: No signature below confirms that he received the original Bill of Lading (indicated by Check) ☐ Yes

Signature of Agent | Per

CERTIFICATE OF ISSUING OFFICER

Contract No. or Purchase Order No. _____ Dated _____
Or Other Authority for Shipment

F.O.B. Point Named in Contract _____

Signature of Issuing Officer _____

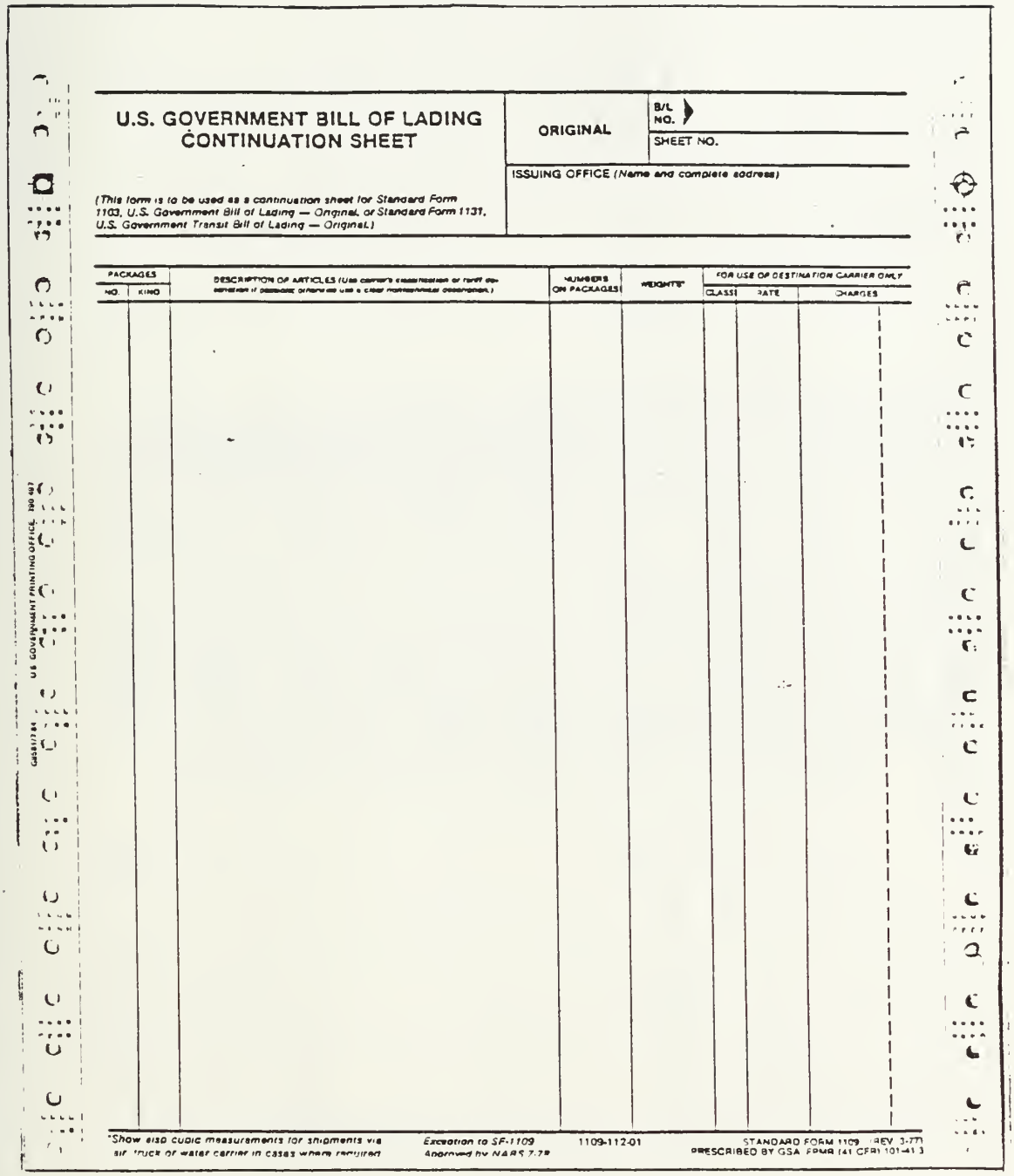
NAVAOS TEST FORM NSCO 4611/14 (1-81)

1

☆ U.S. GOVERNMENT PRINTING OFFICE 1984—790-730/A338

TABLE 13

GBL/CBL CONTINUATION SHEET



U.S. GOVERNMENT BILL OF LADING CONTINUATION SHEET

(This form is to be used as a continuation sheet for Standard Form 1103, U.S. Government Bill of Lading — Original, or Standard Form 1131, U.S. Government Transit Bill of Lading — Original.)

ORIGINAL

B/L NO.

SHEET NO.

ISSUING OFFICE *(Name and complete address)*

PACKAGES		DESCRIPTION OF ARTICLES (Use carrier's classification or tariff description if necessary; otherwise use a clear nomenclature description.)	NUMBERS ON PACKAGES	WEIGHTS*	FOR USE OF DESTINATION CARRIER ONLY		
NO.	KIND				CLASS	RATE	CHARGES

*Show also cubic measurements for shipments via air, truck or water carrier in cases where required

Exception to SF-1109 Approved by NARS 7-78

1109-112-01

STANDARD FORM 1109 (REV. 3-77)
PRESCRIBED BY GSA FPMR (41 CFR) 101-41.3

GSA/TSD US GOVERNMENT PRINTING OFFICE: 1980 987

TABLE 14

DD 1384 TCMD

TRANSPORTATION CONTROL AND MOVEMENT DOCUMENT (4610)
PAGE NO.
1
DD FORM 1384 NOV 1 APR 84 SN 0102-LF-013-8100
REPLACES EDITION OF 1 APR 83 WHICH MAY BE USED

TABLE 15

AUTODIN ATCMD CARD

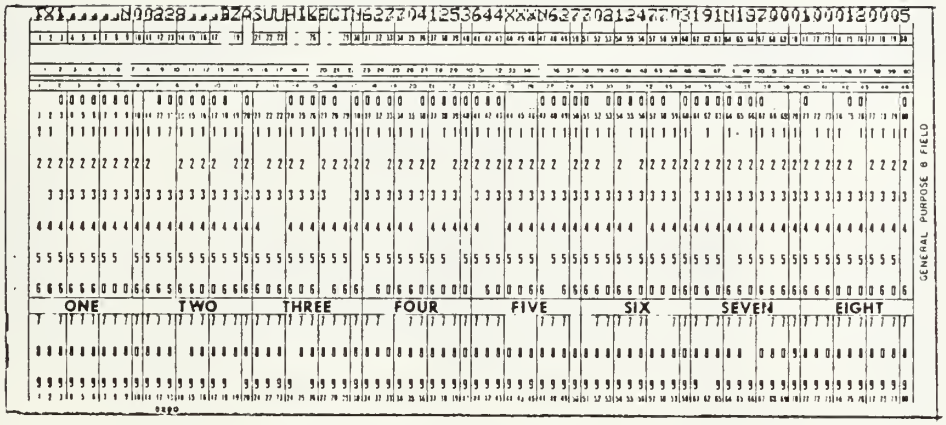


TABLE 16

AIRBORNE INTEGRATED DATA BASES DISC UTILIZATION IBM 3380

AIRBILLD	Airbill Data	1500
AIRBMSCD	Airbill Miscellaneous Data	2000
ABCUSTS	Airbill Customer Number Index	250
ABCUREFS	Airbill Customer Ref Num Index	50
ABLANES	Airbill Lane Segment Index	100
ABABNOS	Airbill Number Index	100
CONSOLD	Consol Data	75
CONAIRD	Consol Airbill Reference Data	750
CONDLTD	Consol Detail Data	80
CNALSTAS	Consol Airline/Control Sta Index	25
CNORGNS	Consol Origin Station Index	35
CNDESTS	Consol Destination Sta Index	35
MANFSTD	Manifest Data Base	300
STROUTD	Station/Route Primary Index	5
ZIPD	Zip Code Data Base	10
STAZIPS	Station/Zip Code Index	8
TOTAL Cylinders		5363
Character Storage		3,826,000,000

Rating DB

TARIFFD	Tariff Data Base	9
TRFNATS	Tariff Nat'l Acc'ts Secd'ry Index	1
TRFLANS	Tariff Lane Segment Secd'ry Index	1
TRFXPRS	Tariff Express Secd'ry Index	1
SCALED	Scale Data Base	1
SCSCTYPS	Scale Types Secd'ry Index	1
TOTAL Cylinders		14
	(FOCUS + Batch X 2) =	28
Character Storage		19,900,000

International DB

LOCTNCOD	Location Code Data Base	2
LOCTNCDI	Location Code Primary Index	1
FLTSCHED	Flight Schedule Data Base	5
FLTSCHDI	Flight Schedule Primary Index	1
FSDESTS	Flight Sched Dest Secd'ry Index	1
TOTAL Cylinders		10
Character Storage		7,121,000

Table 16
AIRBORNE INTEGRATED DATA BASES DISC UTILIZATION IBM 3380 (cont'd)

	Customer-Prospect DB	
CUSPRSD	Customer/Prospect Data Base	250
CPSHPTD	Customer/Prospect DB Summary	1
CUSPRSI	Customer/Prospect Primary Index	10
CPRNCTLS	Name/Control Station Secd'ry Ind	55
CPRMGTNS	Merge to Number Secd'ry Index	1
CPRSTNMS	Station/Name Secd'ry Index	50
CPCTLKCS	Cont-Sta/Key Code Secd'ry Index	25
TOTAL Cylinders		392
	(FOCUS + Batch X 2) =	784
Character Storage		560,000,000
	Accounts Receivable DB	
ACTRECD	Accounts Receivable Data Base	640
ACTRECI	Accounts Receivable Pri-Index	100
ACTRECS	Processing Date Secd'ry Index	80
TOTAL Cylinders		820
Character Storage		595,000,000
	Data Dictionary DB (EST.)	
DTEDBS	Data Element Data Base	10
SEGDBS	Segment Data Base	10
DBSDBS	Data Base Data Base	10
PCBDBS	Program Comm Block Data Base	10
SYSDBS	System Data Base	10
EXTDBS	Extensibility Data Base	10
TOTAL Cylinders		60
Character Storage		42,000,000
	Walker Interactive Accounts Payable System Package	
IMS Data Base (Cylinders)		800
Character Storage		570,000,000
	TOTAL FOCUS System Data Disc Storage Utilization	
Cylinders IBM 3380		7,865
Total Character Storage		5,620,000,000

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